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The EME Journal is the magazine of the Land Electrical and Mechanical Engineers, published at NDHQ under the terms of reference of the Director General Land Engineering and Maintenance and the LEME Branch Advisor. The purpose of the publication is to disseminate professional information among members and exchange opinions, ideas, experience and personnel news, and promote the identity of the LEME Branch.

The EME Journal depends upon its readers for content. Articles on all aspects of the Electrical and Mechanical Engineering System, photographs, cartoons, people news and comments are solicited. Readers are reminded that the Journal is an unclassified and unofficial source of information. The contents do not necessarily represent official DND policy and are not to be quoted as authority for action.

Contributors are asked to submit the original text typewritten, double spaced, paper size as herein. Photos should be sharp, glossy, black and white prints with captions typed separately. Personnel should be identified in all cases, both text and captions, by rank, initials, surname, trade and unit.

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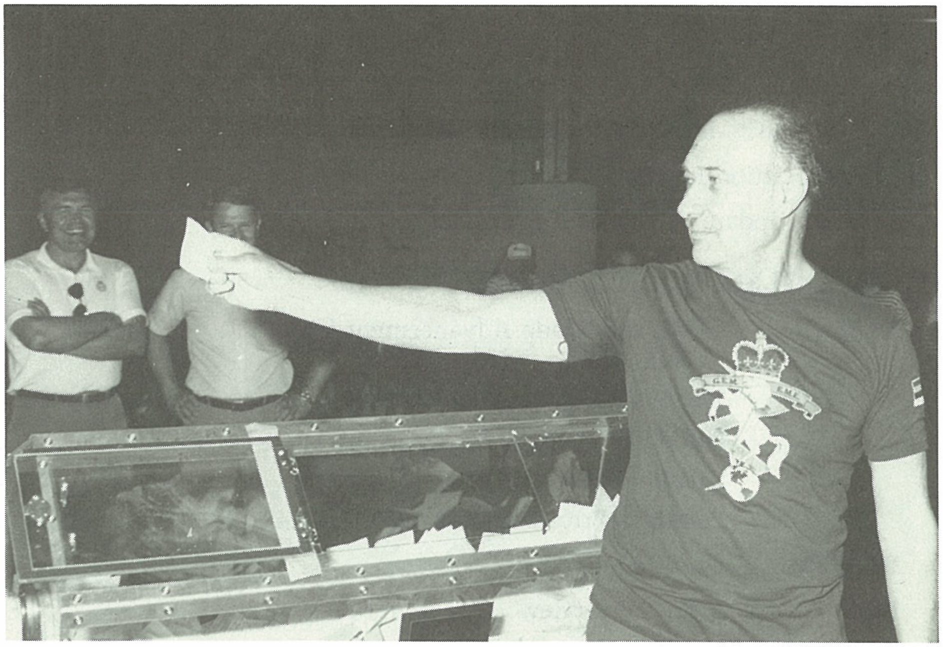
The Second RCEME 50th Anniversary Car Raffle

By Major C. Giguére, OC HQ & Stds, CFSEME

At 1400 hours 22 June 1990, spirits were unusually high at LETE Orleans amongst the 500 to 600 LEME pers who had gathered to participate in the Ottawa LEME Sports Day. By that time, not only were the results of the sports events very tights, but the draw of the RCEME 50th Anniversary Fund Raising Raffle was just about to happen. Col W.G. Svab, the Colonel Commandant, helped by Maj Camil Giguere, the draw OPI, started the barrel rolling, while for a moment the crowd stood still. Col Svab finally opened the barrel door and pulled out the ticket of the winner of the first prize Chevrolet Corsica 1990, "WO G. Penny, from 2 Service Battalion Maint Coy, Petawawa, Ontario."

Then, BGen J.I. Hanson, the Branch Adviser, took his turn and grabbed from the barrel the ticket of the second prize winner, Mr. R. Grenier, from CFB Valcartier won a one-week trip for two to Jamaica. Col V. Pergat, CFSEME Commandant, then pulled the name of MCpl D. Cameron from CFS St-John's as the winner of the third prize Sony Camcorder Video Camera.

Thirty thousand tickets were distributed amongst all units with LEME pers, LEME(A) and RCEME(A) in early Jan 90. The sales started promptly and, by late Feb 90, some units were already reporting 100% sales and were requesting more tickets. Altogether at the end, approximately 70% of the tickets were sold. It is estimated, at the time these line were printed, that this year's draw will have brought in a net profit of approximately $14,000, after the prizes and the cost of printing the tickets will have been recovered.


The LEME Colonel Commandant, Col W.G. Svab, holds in his hand the winning ticket for the 1990 Chevrolet Corsica.

The response from most units was good. The raffle remains the single most efficient fund-raising scheme for the 50th Anniversary celebrations in 1994. Next year's draw is already being planned, with some changes, which promise to make it even more exciting!

Once more, thank you for your efforts to support the 50th Anniversary of the Branch.

ARTE ET MARTE

Col V. Pergat, Commandant CFSEME with in his possession the winning ticket for the third prize of the RCEME 50th Anniversary Raffle.

BGen J.I. Hanson, under observation of Maj Giguère is ready to announce the winner of the trip to Jamaica.

LEME Association Report

The LEME Association's 1989 Annual Conference was held at CFB Borden on October 20th and 21st. Unlike the year before when the Conference participants were greeted with a heavy fall of snow, blocked roads and fallen trees, the weather this year matched the warm welcome we received from the Base Commander and the Commandant of the School! The two-day program included a Council meeting on the Friday, the Annual General Meeting on the Saturday and the Annual Mess Dinner on the Saturday evening.

The LEME Association Council comprises the Association's executive, the Chapter chairmen, the Committee chairmen and representatives of the Militia service battalions/maintenance companies. The agendae of Council meetings usually consist of a presentation on an item of topical interest, updates on the LEME Militia, and initial consideration of resolutions. The Council Meeting was a bit different this year and it was not all work since it included a visit to the Honda plant in Barrie!

Another highlight of the Council meeting this year was the annual update on the LEME Reserve by the SSO Maint HQ FMC, LCol J.F.J. Forget. Here are a few brief highlights. The strength of the LEME Reserve rose in 1989 to 1,030. This is up 18% from 853 the year before and is double the strength of 9 years ago. These figures reflect some good recruiting work by the militia service battalions!

Of these reservists, 1001 are the LEME Militia of Mobile Command. Not in the LEME Militia but nevertheless still part of the LEME Reserve, are the 24 LEME Reservists who serve in Communications Command, the 4 in Air Command and the 1 LEME Reservist in Maritime Command. LCol Forget noted that having LEME Reservists in commands other than Mobile Command raises the issue of what uniform they should wear. Another important point is that the LEME Association has as one of its objectives the support of the LEME Militia and accordingly has focused its attention on Mobile Command. However, it would appear that the Association should interpret its objective more broadly so as to include LEME Reservists in all Commands and is a point which the Executive will take into consideration over the next year.

Turning to Mobile Command for a moment, where does the LEME Militia serve? Approximately 2/3 serve in Militia service battalions. The other 1/3 are in 1st line units or Headquarters. Geographically 43% serve in Central Militia Area, 21% in Prairie Militia Area, 18% in Atlantic Militia Area, 10% in Secteur de l'Est and 8% in Pacific Militia Area.

In commenting on LEME Militia training, LCol Forget noted that the EME Reserve School (EMERS) had a very successful in this its third summer of operation. He also noted that it had maintained its growth. 32 courses were conducted in 1989 compared to 22 in 1988. The number of graduates increased to 244 from 178. Some courses were conducted in French at the Ecole Technique des Forces Canadiennes at BFC St. Jean.

LCol Forget mentioned that the Army is moving towards the concept of one task/one standard. This means that whether the task is performed by a Regular Force or a Militia technician, it will be performed to the same standard. In other words, the Army will be implementing Mobilization Specifications. There are many problems associated with this policy not the least of which is the time it takes to train a craftsman to Mobilization standards. It is an area where much work will have to be done over the next few years.

One major aspect of the Association's Annual Conference is the consideration of Resolutions which are intended to draw the Government's attention to deficiencies in the Nation's defence and recommend corrections. Resolutions are reviewed in detail during the Council meeting then refined and voted on at the Annual General Meeting. Eight resolutions were approved this year and will be discussed more fully in the next report.

The Annual General Meeting included briefings by the DGLEM and the Colonel Commandant as well as Chapter reports. A highlight of the this year's AGM was the opening of the Lesueur Brodie Building which is the new Armament Training facility at the School. The Association was pleased that its long time (30 years) secretary-treasurer was so honoured. Mrs. Brodie officially opened the building and was the guest of the Association at lunch after the ceremony.

A feature of the Mess Dinner was the attendance as usual of the Regular Force officers who are under training at the School. These include the Phase 4 and Phase 3 students. This arrangement provides an excellent opportunity for the Association's members to meet the new officers of the Branch and be updated on the latest trends. The dinner program this year had two items of special interest. The first is that Maj (Retd) Bert Olver was granted Honourary Life Membership in the LEME Association. This was in recognition of over 30 years of dedicated service to the Toronto Chapter. The second item is that the DGLEM, BGen J.I. Hanson, presented Maj Stan Gill with a special DGLEM's Award. This was in recognition of the hard work and leadership he has demonstrated over the past several years in the founding and operation of the EME Reserve School.

At the Annual General Meeting a new executive was elected for the coming year. Members of the Executive are as follows;

President — Col (Retd) M.C. Johnston,

Vice Presidents
- 1st — LCol A.R. McLaughlin,
- 2nd — Maj (Retd) A. Adams,
- 3rd — Maj (Retd) D. Hardy,

Treasury — LCol R. Hilliard,

Secretary — LCol (Retd) D.B.S. Perrin,

Assistant-Secretary — LCol (Retd) F.W. Chapman and

Immediate Past President — LCol (Retd) R. Felsted.

DGLEM Division Departure Gift for BGen J.I. Hanson

On 29 June, Col A.L. McEachern presented, on behalf of all military and civilian personnel of the DGLEM ivision, a Craftsman statuette specifically designed as departure gift for BGen Hanson, DGLEM and LEME Branch Adviser. The following photographs are a good souvenir of this presentation.

Gen J.I. Hansen
Best Wishes from Your Division

Vehicle Technician

Occupation Adviser Update

by Maj J.G. Dubé

The Vehicle Technician Occupation Adviser's function is a secondary duty to DSVEM 2. As LCol Peter Britt, the former Vehicle Technician Occupation Adviser was posted out to PM/MOST in July 89 with no replacement, I was then appointed DSVEM 2 and, of course, Vehicle Technician Occupation Adviser until the position is filled during APS 90. LCol Jean Forget, currently SSO Maint FMC HQ, will be appointed DSVEM 2 during summer 90 and will, of course, assume the Vehicle Technician Occupation Adviser duties from there.

To assist me in this task, I am fortunate to have CWO Shoemaker who has been assuming the Assistant Vehicle Technician Occupation Adviser's function since APS 88. He is doing an excellent job and has shown his dedication to MOC 411.

The year 1989 has been another excellent year for promotions in the Vehicle Technician trade, a year where we have seen a substantial increase of promotions in the ranks of MCPL to WO. During the past year, there has been 10 promotions to CWO, 27 promotions to MWO, 48 promotions to WO, 87 promotions to SGT and 113 promotions to MCPL. To all of you, congratulations on your promotion and keep up the good work.

This year, the Vehicle Technician Occupational Advisory Working Group annual meeting was held at LETE on 7 and 8 Nov 89. Participants were from Commands, CFTS, CFSEME, 202 Workshop Depot and available CWO's from the Ottawa area. These annual meetings are designed to be a forum to inform all participants of the current status of the Vehicle Technician trade and to discuss Vehicle Technician trade problems and future trends. This year has, again, generated numerous discussions and I would like to summarize some of the major items discussed.

Trades Badges Trades badges have been approved for wear and should be available in the CFSS sometime in 1990.

Metal Shoulder Titles These have been approved and should be available in the CFSS by end of 1990.

New QL 6A Training The old QL 6B course was introduced to confirm and ensure technical competence of SR NCO's being promoted to WO whereas the new QL 6A course is designed to prepare MCPL vehicle technicians for the technical requirements needed at the SR NCO level. The transition from the old to the new course has created a large backlog which is further complicated by a continuing stream of promotions. To clean up this backlog and to achieve a steady state for the new QL 6A course, several options were considered. After a lengthy discussion, a consensus was arrived at whereby the new QL 6A training backlog would be eliminated by initiating a new QL 6A adjustment course which will consist of the Common LEME training package only. The implementation date of this proposed option will be announced at a later date. The prerequisites for qualification will be as follows:

a. all WOs and SGTs now without the old QL 6B or the new QL 6A course are subjected to the new QL 6A adjustment training course; and

b. all MCPLs and A/SGTs will have to pass the new QL 6A training loaded by merit.

QL 8 Proposal As there is no training difference between a CWO and a MWO, there was a consensus concerning the need of a CWO qualifying course. A 6 to 8 day course duration was suggested to meet this requirement.

Performance Oriented Electronics Training (POET) The proposed POET course should be implemented in the 411, 421 trades in two years from now. The proposed course of approximately 20 weeks duration will be a prerequisite to QL 3 Vehicle Technician training.

Tool Boxes — Field Force Vehicle Technicians During the year, the current brown box will be replaced by the three drawer companion which is of a heavier gauge metal and will house the metric tools.

In summary, through this article, I wanted to bring you up to date on some of the topics that were discussed at the Vehicle Technician Occupation Advisory meeting. Should you have comments or feedback, I and thus the EME Journal would be interested to hear it from you!

FROM DGLEM DIRECTORATES

DLES

LEME and Trade Advancement for Skill and Knowledge (TASK)

by Major Albert Thibert, DLES 2-3

During 1973 and 1974 the Directorate of Personnel Development Studies conducted a study of the management of Other Ranks' Careers in the CF. This study resulted in the publication of a report entitled, Other Ranks' Career Development Program (ORCDP). The aim stated within that report was to develop a systematic approach to the management of other ranks' careers in light of the review needs, and the needs of the individual.

One of the six categories identified by the Other Ranks' Career Development team presented to the Defence Management Committee (DMC) was that compensation policies be based on pay for rank and pay for individual trade skill achievement, and that the CF adopt a system of career advancement based on lateral skill progression and vertical rank progression.

In October 1983, Trade Advancement for Skill and Knowledge (TASK) was adopted by the Military Personnel Planning Board (MPPB) which also endorsed further staff action as well as authorizing CPD to conduct TASK Phase I implementation, namely, the development of an achievement based approach to promotion, pay and badging in the first four years of Other Ranks' Service and conduct project definition for TASK Phase II, implementation of the TASK policy framework for service beyond four years.

In 1986, Program Control Board (PCB) approved the establishment of a Project Management Office (PMO) to further develop the TASK concepts. Since the scope and complexity of the undertakings assigned were considerable and would eventually impact on every component of the CF's Personnel System the project activity was sub-divided into distinct phases:

a. Rank rationalization — to identify the number of rank levels necessary to maintain effective command and control in peace and war;
b. Reward System — to enunciate what the CF values, in terms of the human behaviour and achievement and wishes to reward;
c. Occupation Progression — to define the procedure, mechanisms and limitations associated with the separation of rank and occupational skill progression;
d. Lateral Yardstick — to develop a new classification standard to measure the relationships between all CF occupations upon which to base occupational pay differentials; and
e. Compensation — to define the pay system that will provide increased pay not only for rank but also for acquisition of higher levels of occupational expertise.

A number of studies were commissioned in the ensuing years to deal with these issues. This led to the identification of numerous problem areas:

a. NCM frustration over lack of recognition and rewards for acquiring higher levels of occupational expertise;
b. NCM dissatisfaction over a pay system that provides occupational groupings rather than demonstrated individual performance;
c. NCM dissatisfaction over the size of pay differentials between occupations;
d. a rigid reward system that acknowledges career progression solely through rank promotion which in turn has led to:
    (1) the use of higher rank to pay for occupational expertise,
    (2) the loss of skilled "hands on" tradesmen through promotion to supervisory rank levels,
    (3) NCM frustration at having to seek higher regards through promotion regardless of whether they wished to be supervisors, and
    (4) the degradation of the authority of rank by rewarding occupational excellence through promotion in rank regardless of the individual's ability or desire to lead and supervise;
e. too many NCM rank levels;
f. establishment over-ranking and rank creep; and
g. a rigid career progression structure that has fused rank and occupational progression for all occupations.

The identification of these problem areas allowed PMO TASK to focus its analysis on the appropriate specific components of the Personnel System, typically:

a. personnel structure and organization, including:
   (1) the rank structure,
   (2) establishments, and
   (3) military occupation structure;
b. personnel management, including:
   (1) recruiting,
   (2) training,
   (3) retention,
   (4) reward system,
   (5) compensation, and
   (6) morale.

In addition it was necessary to determine in both qualitative and quantitative terms NCM perceptions and attitudes toward current career progression and reward structure. Each of these areas were studied and reviewed at both NDHQ and Command levels. A series of specific concerns evolved and were identified for additional development. Of these, career progression and rewards figured prominently. The ensuing analysis resulted in four options proposed for TASK implementation which required revision to the following components:

a. rank — adjusting the junior NCM rank levels;
b. career progression — providing for separate rank and skill progression; and
c. compensation — providing a pay system based on both rank and occupational skill acquisition.

The most critical or sensitive change of these three components is that associated with modifying the current compensation system, or how we intend to "pay for skill". All other changes would be introduced with or without a new compensation structure, accordingly, implementation planning for this new system generated a number if critical activities which needed to take place. These include:

a. a decision on the rank levels applicable to the junior NCM rank structure (ie., doing away with the MCpl appointment);
b. an establishment review of all occupations to determine the number of rank levels each requires and the degree of linkage between rank and occupation qualifications;
c. financial definition of the Lateral Yardsticks and its application to all CF occupations;
d. a decision on the modifications which will be made to the CF Pay System;
e. detailed costing of the new compensation structure;
f. Senior Management approval; and
g. Treasury Board Endorsement.

In June 1989, the CDS directed the PMO TASK development phase be extended by a further 18 months. This permitted TASK to proceed with the military occupation review and analysis of all positions in all NCM occupations to confirm the appropriate rank, qualification and special qualification for each establishment position.

It is on this last activity that the EME Branch has been focusing its attention on in recent weeks. A series of Occupation Review Boards were conducted for each of the four EME occupations to review and confirm the rank, qualification and special qualifications required for each EME established position and to make specific recommendations to PMO TASK on the best compensation methods for the special qualifications assigned to each positions. Nearly 4200 EME positions, were assessed by the four Trade Boards.

Each Trade Review Board, composed of one CFR Captain and three Senior NCM, conducted an in depth analysis going over each position at least three times to determine the appropriate rank, qualification and special qualification. Their findings were entered into the PMO TASK Database from which specific data tables were generated. These subsequently formed the bulk of the individual Board reports to the Branch Advisor along with their recommendations on the viability of TASK for the EME occupations.

This analysis phase will only be completed once each environmental Command and the Branch has had a chance to assess the full impact of the theoretical models derived by the Review Boards on their respective organizations and establishments. The impact on the EME NCM rank and occupation structure that we have grown accustomed to over the years will be both dramatic and far reaching. It is therefore imperative that all avenues are scrutinized and considered fully by Senior Officer and NCM staffs at both NDHQ and Command levels. At this time, it is too early in the development process to comment on the viability of TASK. Rest assured however, that DLES and the Branch will follow this project very carefully and weigh thoroughly all the advantages and disadvantages of any proposals before committing itself to any TASK recommendations.

This has been but a brief synopsis of an ongoing initiative. Voluminous papers and reports have been prepared, in support of this very important project, which provide greater detailed analysis of each phase of the ORCDP programme. This review of the LEME occupations by the Branch for PMO TASK is but one small step in this process and certainly does not represent the final chapter on TASK for LEME. ARTE ET MARTE.

The NATO Single Fuel Concept

by Maj D. Cloutier, DLES 2-4

The "Single Fuel Concept" (SFC) is now the accepted position of the NATO Pipeline Committee (NPC) and Canada as a member of this forum agreed to this concept in 1987. The NATO goal is worded as follows:

> "To achieve equipment interoperability through a single fuel for use on the battlefield and for land based air operations, ensuring that the specification of that fuel is standardized with its commercial equivalent in common use in NATO Europe, and that its physical and chemical characteristics are such that it can be introduced, stored, transported and distributed by the NATO Pipeline System (NPS)".

"To achieve equipment interoperability through a single fuel for use on the battlefield and for land based air operations, ensuring that the specification of that fuel is standardized with its commercial equivalent in common use in NATO Europe, and that its physical and chemical characteristics are such that it can be introduced, stored, transported and distributed by the NATO Pipeline System (NPS)".

By the year 2000, the Central European Pipeline System (CEPS) will contain only F-34 fuel. This reveals some very real and serious logistic, operational and technical problems for the CF operating in Europe. The following implications create some major concerns:

a. only compression ignition or turbine engines can be used to power land equipments in the forward areas;

b. the use of gasoline is eliminated in the forward areas;

c. F-34 (or F-35) is adopted as a replacement for diesel fuel starting in the forward areas. (*Note:* F-34 is equivalent to the aviation jet fuel F-35 (Jet A-1) with the addition of a corrosion inhibitor/lubricity improver and a fuel system icing inhibitor).

From a land maintenance point of view, these implications strongly suggest that all future equipment acquisitions and their associated specifications must be examined to ensure that they are compatible with F-34 fuel. This also implies that fleet planning decisions should be made on present gasoline fuelled equipments (Iltis, 5/4 Tonne, commercial and airfield support equipment) with regard to phase out, possible conversion and/or alternate plans for use. The adoption of F-34 would also include the requirement for a programme of tests which will identify the effects of using F-34 in existing diesel powered land equipment and the necessary modifications to correct any technical shortfalls.

To date, no action has been taken by the CF to prepare for the implementation of this concept. Based on the above considerations, it is critical that a CF SFC policy be developed to provide the necessary direction and guidance to meet this requirement. DGLEM has in the past few months been pursuing this matter with C Log Do and other staffs at NDHQ with the request that a policy statement be made soon.

Battlefield Damage Repair (BDR) in the Land Forces

by Maj D. Cloutier, DLES 2-4

Canada has been a member of the NATO Vehicle Recovery Interoperability Working Party for some years. Concurrently, Canada was also an observer on the Eurolog Battle Damage Repair of Land Equipment Working Group. In July 1989, Canada, represented by DLES, joined the new NATO Land Forces Battlefield Recovery and Repair Working Party which is basically replacing the two previous committees.

Recent initiatives within DGLEM over the last couple of years resulted in a BDR policy paper (second draft) being issued by DLES 2 in May 1989. This paper provides a starting point for what is considered to be the official Canadian BDR definition. Simply stated the Canadian BDR definition is:

> *"Essential repairs carried out rapidly in a battle environment, using improvised methods, in order to return damaged or disabled equipment to temporary or permanent service."*

As you may realize, BDR will simply become an extension of "Field Expedient Repairs" which has been part of the Land Maintenance System (LMS) throughout its evolution. The greatest concern in implementing BDR is that it is highly dependant on the technician's experience and imagination. More so than any other field of activity, BDR expertise comes from training, hands on practical experience and the imagination and innovating expertise of the individual technician. Because of their very nature, BDR repairs may fall short of legal safety standards and will occasionally achieve serviceability while creating more expensive damages. Furthermore, being often temporary in nature, some BDR repairs will have to be redone later in order to restore full serviceability to the equipment. The aim of BDR is to immediately render a weapon system capable of achieving the next mission.

Since not all BDR techniques will have negative side effects, the techniques are divided in two types: safe and unsafe. Safe BDR techniques are ones that will be allowed in peacetime and on equipment in service. They shall not endanger the crews, or cause damages to the equipment and shall render it serviceable according to safety regulations, for example, the Highway Traffic Act. These repairs may be permanent or temporary. Unsafe BDR techniques are those involving a risk to the crews, the equipment, its sub-systems or involving a breech of safety laws. Because of these negative aspects, unsafe BDR techniques will only be permitted in wartime and only on condemned equipment in peacetime.

A plan is being developed to implement BDR as an integral part of our EME training and repair techniques. To this end, LETE has been tasked to identify all potential and currently practiced BDR techniques based on predictable and expected battlefield damages. These techniques will be tried and tested as required and when approved, will be assembled into a CFTO that will be used as a CF Catalogue of BDR Techniques. LETE has been tasked to provide recommendations in the following main areas:

a. what BDR techniques shall be labelled safe and unsafe;

b. separating techniques into operator, first line and higher organization responsibility;

c. what special techniques should be added to operator instructions or maintenance manuals of specific equipment;

d. what should be taught and to whom;

e. what equipment, tools and expendable items are required;

f. what scaling changes should be performed;

g. what design criteria should be added to equipment or what modifications should be performed on existing equipment which could improve survival and ease of repair; and

h. what specific BDR area should be researched more thoroughly.

Upon completion of the LETE project, a number of key decisions and staff actions will have to take place in order to implement BDR especially in the area of training.

BDR is not a new concept. Every nation that participated in a war in the 20th century was eventually forced to resort to it. There will always come a time in battle when the lack of time and resources will dictate unconventional means in order to survive. When this happens, it becomes obvious that the peacetime concepts of repairing equipment to full capability and in an economical way may no longer apply. The art of "Field Expedient Repairs" has been a trademark of our Branch and tradesman since the RCEME Corps was formed in 1944. Our reputation has been built to a large extent on our ability to perform technical miracles under adverse conditions. This project and eventual CFTO will recognize this as a necessary trade skill which must be stressed throughout the development and training of all members of the EME Branch.

Outside Eyes

by Maj C.R. Tramer, DLES 2-2

By now the Posting Plot has been cast in concrete and you're ecstatic about being the next Workshop Commander at CFB Lower Armpit. Of course, the news that an OSEER is about to get under way isn't too thrilling, but how bad can that be?

It can be devastating!

The trouble with an OSEER is that even if you really put your heart into it and do a fantastic job, you won't necessarily see additional people. However, if you don't do your homework you can be guaranteed of seeing less. Fortunately, you are not facing this ordeal alone. It's during the OSEER process that we in DLES can truly say we are here to help you. We provide the "outside eyes" that can quickly spot the procedural errors, organizational anomalies and safety infractions that need to be corrected before you can hope for a successful OSEER.

Those outside eyes usually take the form of the DLES 2 staff during a Staff Assistance Visit (SAV). The average time required to discover the closet skeletons during a SAV is 45 minutes. The rest of the time is usually spent finding more of the same and serves to confirm the depth of problems. Experience and system knowledge help, naturally, but its the objective viewpoint of an outsider that provides the clarity of vision essential for success. Proof lies in the number of faults uncovered during the last 10 years of SAVs to maintenance organizations where the B Maint O was never aware of them, and they existed in his shop from the day he took command. A clear indication of being too close to the trees if I every saw one.

Whether an OSEER is impending or not, the outside eyes should be applied to your shop as soon as possible. You can always request a SAV from DLES, but the way budgets are going, you may have to pay the TD bill yourself. There is another way, and one that in many ways is better. Be your own outside eyes!

All you need is a good knowledge of the LMS — and you already have that or you wouldn't be getting this job — and a checklist of questions to ask at each and every work centre in the workshop. One caveat is that this will only work if you do it immediately on arrival at your new posting. As little as 24 hours is all it takes for problems to face into the backgroud haze of everyday crisis management. I would advise you to inspect the shop even before you clear in. At least do it soon enough that your eyes are still truly "outside eyes". And put your findings in writing! That way you can gradually make the necessary changes to correct all of the problems that you find.

You provide the outside eyes and we'll provide the checklist. You will be surprised at what you find. That, however, is much better than being embarrassed when we find it.

LOMMIS Error Statistics 1989

This report has been prepared to give the figures on LOMMIS error rates for 1989. It would not be fair to do a straight comparison of all units to declare an overall winner. After all, a unit that submits only a few workorders each year should have less problems making sure each one is correct. The tables that accompany this report therefore divide the units into three categories based on total workorders submitted. The large units in Table 1 include all those units which submitted more than 3000 workorders, Medium units are those who submitted between 500 and 3000, and small units submitted less than 500 workorders. In order to prepare the tables however these categories were assigned based on the nine months ending Dec 89. Some units will therefore have exceeded these limits when their December inputs are included. The ranking includes any credits given to units because of key-punch errors or errors not due to the units inputs. The figures do however include time accounting errors for the Weekly Activity Summaries submitted during the period from January to August. Weekly Time summaries have not been included in the workorder error lists since the introduction of the EL 7 with the September production run in October.

The major source of errors continues to be, to paraphase a real estate agents list of the three most important influences on house prices, USAGE, USAGE AND USAGE. Over twenty percent of all errors are related to usage. Fifteen percent are because usage is less than previously recorded and the other five percent or so are excess usage. We cannot stress too much the importance of verifying your reported usage with the EM 26 before submitting your workorder. Nor is it a good idea to resubmit the usage on your re-input workorder certifying the usage as correct without verifying that usage from the vehicle records.

The worst case of incorrectly certified usage happened a few years ago when a unit, which shall remain nameless, certified that excess usage reported on an APC was correct without this check. Because of this the incorrect usage was accepted and the vehicle was selected as a candidate for rebuild. Others in the rebuild selection chain should have caught the error but everyone believed the usage on the LOMMIS report. The error was not detected until after the rebuild was completed at a cost of many thousands of dollars. Would you like **your** unit to be the one responsible for a similar expensive error?

Our congratulations go to the following winners in each of the three categories:

a. Large Units — CFB Borden and Edmonton;

b. Medium Units — 1 CER Chilliwack; and

c. Small Units — 430 ETAH Valcartier (This unit deserves a special mention because they achieved a perfect record with total inputs of 226 workorders.

ANNUAL ERROR STATISTICS — SMALL WKSP

COMD CODE	CIN	UNIT NAME	ORIGINAL ENTRIES	REINPUTS	TOTAL ENTRIES	ORIGINAL ERRORS	REINPUT ERRORS	TOTAL ERRORS	CREDITS	ERROR RATE
D	250	430 ETAH	226	0	226	0	0	0		.00
B	556	FD 2 SVC BN	2	0	2	0	0	0		.00
D	408	408 TAC HEL SQD	246	2	248	2	0	2		.80
D	560	403 TAC HEL SQD	99	0	99	1	0	1		1.00
D	450	450 TAC HEL SQD	184	5	189	3	0	3	1	1.06
K	508	764 COMM SQD	80	0	80	1	0	1		1.25
D	731	DUNDURN MS	441	8	449	5	1	6		1.30
B	292	5E AMB DE C	255	4	259	5	0	5		1.90
D	249	TAC HEL SQD	187	3	190	5	0	5	1	2.11
Y	991	4 FD AMB MS	457	13	470	21	2	23		2.40
B	244	HQ 1 CBG	479	8	487	14	0	14		2.87
Y	944	444 TAC HEL	161	9	170	5	0	5		2.90
D	307	BMS SYDNEY	161	2	163	5	0	5		3.07
B	783	DET 1 SVC BN	157	8	165	6	0	6		3.60
E	323	BERMUDA MS	106	4	110	4	0	4		3.60
D	426	MONT APICA MS	272	15	287	9	2	11		3.80
Y	946	129 AD BTY	200	9	209	8	0	8		3.80
B	294	2 FD AMB MS	250	7	257	9	1	10		3.89
Y	951	4CMBG HQ&SIQ SQD	374	25	399	15	2	17		4.26
D	736	MILITIA DUNDURN	343	16	359	16	0	16		4.46
D	732	HOLDBERG MS	254	14	268	13	0	13		4.85
D	704	BMS PENHOLD	434	18	452	23	1	24	1	5.09
Y	957	4 MP PL	147	7	154	8	0	8		5.19
B	311	AD ARTY SCHOOL	226	3	229	11	1	12		5.20
B	544	2 RCHA	429	26	455	24	0	24		5.27
E	354	DEBERT	252	13	265	13	1	14		5.28
H	563	MTC BORDEN	71	3	74	4	0	4		5.40
Y	945	128 AD BTY	328	16	344	18	2	20	1	5.52
E	352	HFX DET SYDNEY	324	10	334	19	0	19		5.69
D	324	MS GANDER	299	89	388	95	11	106		5.77
H	794	VERNON DET	416	29	445	25	1	26		5.80
Y	122	HQ CFE	192	10	202	9	3	12		5.90
K	521	ALERT MS	330	22	352	20	2	22		6.25
E	355	SHELBURNE MS	120	6	126	6	2	8		6.30
B	245	HQ SSF	403	32	435	34	2	36	6	6.90
B	206	C SQN	416	42	458	41	4	45	13	6.99
B	293	1 FD AMB MS	210	10	220	15	2	17		7.70
D	321	MS BARRINGTON	119	6	125	11	1	12	2	8.00
T	295	1 FSH	261	25	286	23	2	25	1	8.39
N	905	CCUNME	343	27	370	28	4	32		8.60
H	565	CFSEME COY	426	35	461	34	6	40		8.68
B	309	119 AAD BTY	167	6	173	14	2	16		9.20
S	903	IRAQ UNIIMOG	90	5	95	7	3	10		10.53
S	440	CRD VAL	270	31	301	26	7	33	1	10.63
Y	947	127 AD BTY	280	28	308	29	5	34		11.00
J	756	YELLOWKNIFE	81	7	88	8	2	10		11.36
B	452	FD 5 SVC BN	46	10	56	5	2	7		12.50
B	222	22 FD SQN	369	42	411	47	5	52		12.65
D	760	TACOM RPR MOOSE JAW	104	16	120	17	0	17		14.17
K	735	MASSET MS	82	10	92	12	3	15		16.30
Y	948	4 AD WKSP	177	37	214	38	1	39	1	17.76
S	904	IRAN UNIIMOG	104	0	104	21	0	21		20.19
S	906	89 CLU NAMIBIA	223	36	259	55	16	71		27.40

ANNUAL ERROR STATISTICS — MEDIUM WKSP

COMD CODE	CIN	UNIT NAME	ORIGINAL ENTRIES	REINPUTS	TOTAL ENTRIES	ORIGINAL ERRORS	REINPUT ERRORS	TOTAL ERRORS	CREDITS	ERROR RATE
B	223	1 CER	816	9	825	12	0	12		1.45
D	705	BMS PORTAGE	638	12	650	12	1	13	2	1.69
S	102	202 WKSP DEPOT	1814	31	1845	42	1	43	5	2.06
Y	954	1 R22R MAINT	839	46	885	16	4	20	1	2.15
Y	990	4 SVC BN PL	1888	19	1907	44	1	45		2.36
B	430	12E RBC	959	21	980	24	1	25		2.55
D	730	BMS MOOSE JAW	2628	75	2703	97	3	100	28	2.66
B	251	1 RCR	657	18	675	18	2	20	2	2.67
B	221	2 CER	901	13	914	34	0	34		2.70
H	793	VANCOUVER DET	801	14	815	19	4	23		2.80
B	743	3 RCHA	1007	28	1035	30	0	30		2.90
D	306	BMS SUMMERSIDE	1198	33	1231	34	2	36		2.90
D	501	NORTH BAY BMS	2773	105	2878	89	7	96	12	2.92
D	401	BMS BAGOTVILLE	1790	70	1860	56	3	59	3	3.01
B	431	5 RALC	1221	33	1254	41	1	42	2	3.19
B	741	BMS SUFFIED	1625	57	1682	58	4	62	2	3.57
B	203	RCD	842	21	863	30	1	31		3.59
B	432	5RGC	714	36	750	26	3	29		3.87
B	236	QG 5 GBC	767	42	809	25	7	32		3.96
B	264	AB REGT	688	26	714	28	2	30		4.20
E	369	ST JOHN MS	526	30	556	22	2	24		4.30
D	303	BMS GREENWOOD	1989	92	2081	90	5	95	3	4.42
B	259	2 R22R	1029	47	1076	47	3	50	2	4.46
H	302	BMS CORNWALLIS	641	31	672	29	2	31		4.60
Y	956	3 RCR MAINT	1122	62	1184	47	11	58		4.90
B	782	PL 1 SVC BN	1162	67	1229	60	7	67	1	5.37
D	301	BMS CHATHAM	2017	135	2152	107	10	117	1	5.39
B	237	1 CSR	915	47	962	60	1	61	9	5.41
B	202	LDSH(RC)	822	51	873	51	4	55	2	6.07
E	304	BMS MONCTON	917	52	969	59	0	59		6.09
B	559	PL 2 SVC BN	1112	46	1158	70	4	74	1	6.30
D	702	BMS COMOX	1405	101	1506	90	8	98	1	6.44
Y	985	FMSU	2313	167	2480	152	18	170	9	6.49
B	263	3 R22R	836	60	896	50	12	62		6.90
B	255	3 PPCLI	734	53	787	47	8	55		6.99
B	258	2 PPCLI	950	42	992	69	2	71		7.16
D	305	BMS SHEARWATER	1441	142	1583	102	12	114		7.20
B	252	1 PPCLI	977	93	1070	66	12	78		7.29
Y	920	1 RCHA MAINT	1211	9	1220	102	2	104		8.50
Y	930	4 CER MAINT	1024	76	1100	94	6	100		9.09
Y	912	8CH MAINT	1994	278	2272	167	52	219	12	9.11
D	435	PL 5 SVC BN	1194	141	1335	123	2	125		9.36
J	902	CYPRUS MS	858	83	941	88	7	95		10.10
H	405	BMS ST JEAN	948	112	1060	26	107	133		10.10
B	238	TELS 1 CSR	1140	154	1294	125	9	134		10.36
B	257	2 RCR	544	47	591	54	8	62		10.49
D	402	CFB GOOSE BAY	1846	302	2148	236	45	281	4	12.90
B	781	COY 1 SVC BN	502	92	594	97	4	101		17.00

ANNUAL ERROR STATISTICS — LARGE WKSP

COMD CODE	CIN	UNIT NAME	ORIGINAL ENTRIES	REINPUTS	TOTAL ENTRIES	ORIGINAL ERRORS	REINPUT ERRORS	TOTAL ERRORS	CREDITS	ERROR RATE
H	564	BMS BORDEN	7823	80	7903	90	3	93	19	.98
D	724	BMS EDMONTON	4849	73	4922	74	4	78	8	.98
D	506	BMS OTTAWA	4808	61	4869	61	2	63	8	1.13
E	356	BMS HALIFAX	5922	51	5973	87	0	87	19	1.14
B	712	BMS SHILO	4180	123	4303	118	15	133	55	1.81
B	357	BMS GAGETOWN	12134	317	12451	256	14	270	33	1.90
B	454	BMS MONTREAL	7958	200	8158	183	8	191	4	2.29
D	701	BMS COLD LAKE	2983	93	3076	68	11	79	3	2.47
H	507	BMS KINGSTON	4223	128	4351	127	8	135	3	3.03
D	552	BMS TORONTO	4895	171	5066	191	5	196	16	3.55
B	558	BMS PETAWAWA	5687	243	5930	239	13	252	11	4.06
Y	986	BMS LAHR	5570	243	5813	257	9	266	23	4.18
H	716	BMS CHILLIWACK	6269	286	6555	272	20	292	6	4.36
D	505	BMS TRENTON	3674	118	3792	168	10	178	8	4.48
E	717	BMS ESQUIMALT	4744	217	4961	249	17	266	7	5.22
Y	988	BMS BADEN	3023	360	3383	175	33	208	24	5.44
B	729	BMS WAINWRIGHT	4486	260	4746	252	23	275	1	5.77
Y	984	4 SVC BN MAINT	3690	263	3953	266	10	276		6.98
B	715	BMS CALGARY	5372	443	5815	420	40	460	53	7.00
B	455	B MAIT VALCARTIER	10294	1049	11343	786	107	893	8	7.87
D	711	BMS WINNIPEG	3782	1380	5162	573	51	624	56	11.00

DLAEEM Update

General

There have been significant personnel changes in DLAEEM over the past year. Col A.R. Gillis replaced Col L.A. Leflar as DLAEEM, and LCol S.R. Poole took over DLAEEM 3 during the summer, 1989. LCol J. Holt replaced LCol S.F. Tetarenko on short notice as DLAEEM 5, in May, 1990. LCol Tait and LCol Lindsay are as DLAEEM 2 and DLAEEM 4 respectively. Telephone directory amendments are a challenge.

The Directorate has continued to acquire added responsibilities for complex and varied equipment systems. Major areas include army tactical software, simulation, electro-optics and the land tactical area communications system (LTACS) upgrade. There is also much work to maintain/upgrade currently fielded weapon, telecommunication and radar systems. While there is some disruption caused by Budget cuts, DLAEEM still has a large and growing challenge. Some of its aspects are highlighted in this article.

The projected growth of DLAEEM and its varied technologies have prompted a major reorganization study which *may* result in some type of systems organization and the move of DLAEEM 5 to a new Directorate of Signals E&M. There are also ongoing directorate level initiatives on workload and resources management information systems.

DLAEEM 2 — Weapon Systems

Weapons management has kept all of DLAEEM 2 personnel busy during the past year and will continue into the future.

In terms of large calibre weapons systems, the fleet of M109 155mm Self-Propelled Howitzers will be undergoing a complete overhaul commencing in April 1991 for a period of two (2) years. The fifty (50) Canadian vehicles will be completed at 202 Workshop Depot while the CFE fleet of twenty-six (26) vehicles will be completed at RDM in Rotterdam in conjunction with the overhaul of all Dutch M109s. The fleet will be upgraded to the A4 model and include a NBC system, a turret fire suppression system, smoke/grenade dischargers as well as RAM improvements to various components of the vehicle's chassis.

The L5 105mm pack howitzers are currently being overhauled at Oto Melara, Italy. A total of twenty-three (23) guns will be completed by August, 1990. During the overhaul, a new muzzle brake will be installed which will allow charge 7 to be fired.

On the small arms side, the CF now uses some six handguns in four different calibers of ammunition. It is intended to reduce this to two handguns and one calibre of ammunition. After surveying sixteen manufacturers, sufficient quantities of five contending handguns were procured for engineering and user trial. Both trials have been completed, but reports have not yet been received.

The Rifle, 7.62mm C3 requires refurbishment. This involves the acquisition of a new metric, optical sight as well as the overhaul and modification of the rifles. Prototype sights are under test. When production sights are available, Parker-Hale in the U.K. can continue its rifle refurbishment program.

DLAEEM 3 — Tactical Computer Systems & Simulation

DLAEEM 3-2, headed by Mr. Steve Czyrnyj, supports all army simulators and targetry devices in the field (such as the Invertron Observed Fire System). The bulk of their work has been developing new systems (such as Laser Video disc, Interactice Gunnery Systems — LVIGS) and in project management. In fact, Weapons Effects Simulation (WES), Direct Fire Targetry (DFT) and Command and Control Simulators/Trainers have been allocated almost 300 million dollars in the next seven years in the Defence Services Program.

The Software Engineering Centre (SEC) led by Major Letourneau, is extremely active. Software maintenance for all in-service equipments (Milipac, HP41, GACS) is only a small part of their workload. The group is almost all contractor employees (22) and is currently located at ADGA in Ottawa. The SEC will convert into the Land Software Engineering Facility (LSEF) at LETE about 1993. By then, they will have assumed responsibility for LLAD software and perhaps IRIS as well. Another major project is the Artillery Regimental Data System (ARDS) which will develop a command and control system for artillery regiments and incorporate GACS, Milipac and FABCAS. This will be the first army project to use the NATO standard Ada language.

The hardware (imbedded computers) subsection is headed by Capt Ray Bowler and is currently finishing off the GACS project. GACS is being delivered throughout 1990 to the artillery and it is and impressive (if overdue!) piece of kit. They are also developing ATE policy for DLES and will help define the capability to be established at 202 Workshop Depot. DGLEM artificial intelligence and robotics expertise is here and several developmental studies are under way.

DLAEEM 4 — Electronics (Radar, Electro-Optics, etc)

DLAEEM 4 personnel have been very busy over the past year in both their everyday workload associated with Life Cycle Maintenance Management and Project Management. Some projects were cancelled and others delayed as a result of the April 1989 Budget announcement.

The 33 Muzzle Velocity Indicators (MVI) acquired in July 1989 from AWA Defence Products will replace the aging fleet of Nera Bergen NM87 chronographs used by the Artillery. Calculation and prediction of the next muzzle velocity will help reduce the total budget error and help to attain first round hit. The MVI employs two processors and provides for operator interaction by menus to update ammunition parameters. The first of these systems will be delivered to the Combat Training Centre by late January 1990.

Two SORAS 6 Artillery Sound Ranging (ASR) sets should be delivered by SATT Communications (Sweden) by August 1990. Each set consists of nine acoustic microphones and three different processors which can determine the direction of Artillery projectiles. Once properly set up and the microphones in place, the ASR can deduce the location of enemy targets.

A $40M contract has been let with SPAR Aerospace Ltd for the purchase of 233 Night Observation Devices Long Range. These thermal imagers are capable of identifying a tank size target at approximately 1.6 km. User trials will be conducted during the first half of 1990 at CTC Gagetown. Delivery of the first production units are expected late 1990, early 1991.

The Night Vision Goggles Project is now in its final stages. We now have 2,587 sets in service. All units in Germany have been issued the new goggles and all major units across Canada have received theirs. A contract has been let for the procurement of repair parts. Presently, Bendix-Avelex of Montreal is manufacturing two pieces of test equipment; an Alignment Fixture and a Second Line Test Set. The 1st and 2nd line test sets should be in the hands of the users within six to seven months.

DLAEEM 4-4's Artillery Survey Gyro Orienter (ASGO) project will replace the current twenty year old gyro orienter presently in service. It is a digital gyro capable of meeting the demands of current NATO Standards. The gyro will greatly improve the accuracy and timeliness of indirect artillery fire. Thirty-eight are being procured with a projected delivery date of 1992.

The DLAEEM 4-4 project to develop a device that permits recharging of the NI-Cad batteries used with the Laser Rangefinder direct from the vehicle charging system was completed in Nov 1989. A quantity of 365 battery chargers were manufactured. Presently, installation instructions are being written for the M113, Cougar, Grizzly, Lynx and 1 1/4 ton vans. The type of vehicle the charger will be installed in will be the choice of the unit commander.

The 1989 April Budget has seriously affected three projects in DLAEEM 4-3. The Counter Battery Radar (CB Rdr) and Unmanned Airborne Surveillance and Target Acquisition System (UASTAS) were cancelled. The Artillery Meterological System (AMS) has been delayed by two years. Even though the UASTAS project has been cancelled, a technical evaluation of Canadian CL-227 remotely piloted vehicle is still on-going and is due to be completed by the summer of 1990.

DLAEEM 5 — Tactical Communications

The major thrust of DLAEEM 5-2, under Mr. Bryan Drummond, has been the preparation of the various segment specifications for the LTACS Upgrade Project to revitalize the Army's Area communications system. The April 1989 Federal Budget cancelled TCCCS Phase 2 which was to provide the next generation replacement for the LTACS. This means LTACS must meet this requirement past the year 2000 and upgrade the present torn tape relay message system into a modern NATO compatible switch. Treasury Board Approval was received in July 1989 and the upgrade is due for fielding in the Fall of 1992.

DLAEEM 5-2 also has the Mid-Life Rebuild project involving the refurbishment of S-250 shelters and AN-GRC 103 radios to improve over all system supportability and facilitate integration into the LTACS Upgrade. Finally, the UGC-74 (Milipac TTY) terminal is presently being upgraded to a more supportable, modernized version.

DLAEEM 5-3, headed by Major Terry Curley, has expanded its tactical radio involvement with the requirement to provide technical support of the acquisition for four Tactical Satellite Ground Terminals in aid of the Army's Territorial Defence Role. Procurement is scheduled for October 1991. In July 1987, DLAEEM 5-3 began work to replace the land line communication system used by the mortar crews with a handheld radio. The objective was to introduce a new AN/PRC-126A handheld radio into the system including its data package, training and spares for under a million dollars. This has been achieved as of December 1989.

The design, prototyping and development of all tactical communications installation kits are the realm of DLAEEM 5-4, led by Mr. Jack Mitchell. Major development projects presently under way include a Remote Audio Control Unit for the VRC-46 and Command Post Intercom (CPIC) System for use in all headquarters facilities. The Remote unit is intended to give passengers audio access to the radios in the tactical wheeled fleet. The CPIC will facilitate the passage of information within the Headquarters. In addition, DLAEEM 5-4 has provided LCMM support to all tactical terminal equipment such as the SB-3614 and associated ancillary equipment and has worked on the purchase of eight new switchboards for the field force.

There continues to be an abundance of work in dealing with the requirements proliferated during this period of significant technological evolution in the telecommunications field.

The above summary highlights only a few of DLAEEM 5's activities. Work continues in a wide variety of areas to support and improve Army communications and the DLAEEM 5 staff is dedicated to that effort.

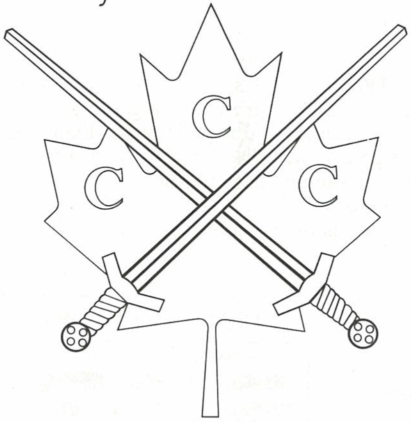
TCCCS

TCCCS — A Brief Overview

PMO TCCCS

NDHQ is know as the land of acronyms. TCCCS (pronounced "ticks"), for those who don't already know, is the Tactical Command, Control, and Communication System. The project has grown and changed considerably since 1978 when its first staff gathered to look at the Army's communications requirements in the 1990's and beyond. The project was originally called the Army Command and Control System 85 or ACCS 85.

Today, the scope of the project is to replace the Army's current combat net radio system, including such well known workhorses as the AN/PRC-77 and the AN/VRC-46 by the TCCCS Radio System, named the Iris System.



The Land Maintenance System, including the communications and Electronics Branch technicians working in maintenance units, will have to maintain all the hardware and software that Project TCCCS buys for the Army.

In September 1988, Treasury Board granted authority for TCCCS to proceed. The full project is estimated to cost over 1.5 billion dollars and will span a ten year period. That's right, TCCCS will continue into the next century.

TCCCS is slightly different from most of the PMOs which DGLEM controls. The majority of the project officers are CELE but there are three LEME officers and a Trg Dev O who is a former RCEME officer. Land Maintenance is well represented by the ten Comm Techs who work in engineering, design, maintenance, and training planning. Two of these are ex-RCEME Rad Techs.

Iris Radio System

The new Iris radios will look much the same as the radios they are replacing. However, they will be very different internally with Electronic Counter Counter Measures (ECCM) features to defeat the Electronic Warfare threat, and they will support data transmission between tactical computers. In fact, most of the new radios themselves might be better described as computers with radio frequency output. Some will have cryptographic hardware built in, and most will "frequency-hop" — that is, change the transmission frequency up to several hundred times a second, in a seemingly random fashion, so they cannot be easily located or jammed. The built-in crypto will help ensure that no useful information can be gained from any transmission which is intercepted. It may even be possible to send crypto and frequency hopping information over-the-air from one radio to another to re-key, or change the parameters of these ECCM systems. However there is a price to pay — the radios will not be cheap, and to enter manually all the required parameters for frequency hopping and encryption will not be quick or even simple.

There are no pictures of the new radios because the hardware has not yet been selected. A Request for Proposal has been issued in October 1989. The plan is that a contract for the whole system will be signed in 1991. Fielding will not take place before 1993, so don't return your current radio to the QM yet.

A New Tool for Life Cycle Material Managers

A project management office such as TCCCS has responsibility that extends beyond the simple purchase of equipment to meet the operational needs of the Forces. It must ensure that everything necessary for the support of the equipment is defined, and purchased if necessary. To meet this responsibility TCCCS, with DLES, is developing the Equipment Information and Tracking System (EITS).

EITS is a computer program which will permit an LCMM to see the complete status of the fleet of equipment for which he is responsible. How many lanterns are held by a particular unit? Which maintenance unit has second level support responsibility for inflatable life-jackets? What is the modification status of radio serial number 73528? The answers to these and similar questions should be readily at hand, and will be through EITS. A series of logical menus within the system

will ensure that LCMMs don't have to become computer programmers to use EITS.

EITS is being developed with related software systems in DND in mind. In fact, EITS was planned as an extension of the automated Configuration Management System (CMS) which is now being introduced within DGLEM. Although the requirement arose from the need to track new TCCCS radios by serial number, EITS is being developed as a generic tool which will help any LCMM to do his job. The TCCCS responsibility to fund the system only extends to the LCMMs who will manage the new TCCCS equipment. Other LCMMs are advised not to ask TCCCS to fund their requirement for new computers within which to run the EITS software . . . the answer will be a firm NO! An initial release of EITS took place during summer of 1989 with the complete release of EITS planned for the summer of 1990. EITS will be made available by DLES to any LCMM who has the necessary computers available.

We are fully convinced EITS will make the LCMM's job easier and that, with time, it will evolve into an indispensable tool for better equipment management.

Integration of Support Requirements

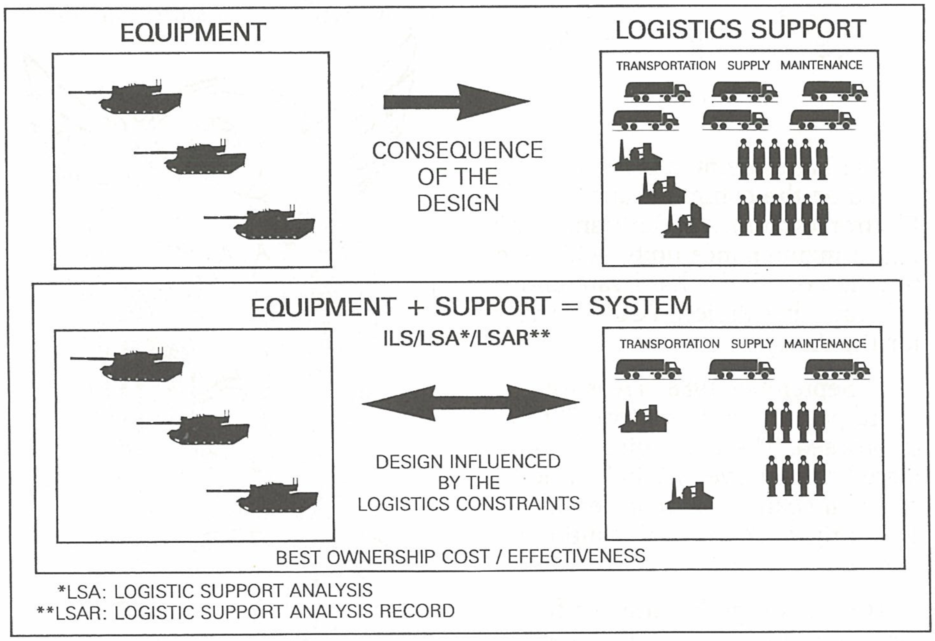
In the past it often seemed that operational performance was the only meaningful criterion for new systems and equipment. Logistics support was only provided as an afterthought. *"If someone can build it, then someone can use and fix it"* held true for the comparatively unsophisticated equipment of yesteryear. But today this adage is not necessarily true. The TCCCS radio equipment will be the first Army wide fielding of equipment with very high density electronic packaging, multi-layer circuit boards and extensive use of surface mounted components. Our radio technicians may find that component-level repair is not even possible without the kind of equipment originally used at the factory to make the item. The duties of maintainers, suppliers, and all users of the new equipment will be more complicated than in the past. Training of unit radio operators will take longer because of the built-in encryption and ECCM features in the radios.

Our increasing reliance on sophisticated equipment and well trained personnel emphasizes the need for good logistics planning and the integration of all logistics considerations. In fact, it is now NDHQ policy that all major capital acquisitions will have a logistics program to improve operational readiness and logistic support management while minimizing operation and maintenance costs. The trend is to do more logistics planning up front and benefit from payoffs in lower support costs year after year. It means that more logistics will be applied at the right time and right place — "Up front where it belongs". This is illustrated in the diagram below which depicts how support resource requirements can be tailored and made more cost effective through early feed-back to the system design.

The TCCCS project has in its ranks a specialized cell to ensure that complete logistics support will be in place before the equipment becomes operational. This is the Integrated Logistics Support or ILS section. Its hallmark is commonsense planning combined with good communication with other members of the project management office. Within the section can be found communications equipment technicians, maintenance officers, logisticians, trainers, and construction engineers who must be familiar with both the equipment and the end users.

The concepts and procedures of ILS planning are not a cure for all the problems associated with the acquisition of sophisticated new equipment. However, ILS does provide a means for planning and achieving an optimum level of performance and logistic support. Most importantly, the concept facilitates and encourages discussion of support requirements between all the key players and improves the likelihood of successfully implementing and fielding a complex project such as TCCCS.

NOTE: The TCCCS Radio System has been named "Iris" after the greek goddess, who is the messenger of the gods in the Iliad. She has golden wings and moves with the swiftness of the winds from one end of the world to the other. She is associated with Hermes, and she is often shown holding a caduceus or staff.


EQUIPMENT
LOGISTICS SUPPORT
TRANSPORTATION SUPPLY MAINTENANCE
CONSEQUENCE OF THE DESIGN
EQUIPMENT + SUPPORT = SYSTEM
ILS/LSA*/LSAR**
TRANSPORTATION SUPPLY MAINTENANCE
DESIGN INFLUENCED BY THE LOGISTICS CONSTRAINTS
BEST OWNERSHIP COST / EFFECTIVENESS

*LSA: LOGISTIC SUPPORT ANALYSIS
**LSAR: LOGISTIC SUPPORT ANALYSIS RECORD

FROM CFTS

Is There Anything Beyond Leadership

by Major D.B. Parker

There have been volumes of works published on leadership and every member of the CF has had many opportunities during the conduct of courses and field exercises to develop the necessary skills. It is a cornerstone of the military everyone takes much pride in demonstrating mastery. Leadership is a skill which must be practised and honed continually for anyone who rests on his laurels too long will see this illusive prey disappear.

Leadership is not only seen as a skill which must be honed but one which incorporates change and new ideas. It is generally agreed the authoritarian leadership styles of the turn of the century would result in mutiny should they be invoked today. The education levels and social values have had their impact, in addition, technological advances have mandated new approaches be adopted. The introduction of automated data processes into battlefield tactics has, for example, put the military into an evolutionary spiral which will keep the players in a constant state of flux until perfection is attained. The military ethos will therefore continue to be subjected to many upheavals; this is a reflection of our times and will demand far more imaginative leadership than ever before in our history.

The challenge will therefore be to balance the fundamental lessons learned from history with the advancements which impact on modern warfare. One such challenge emanating out of the current evolutionary spirals will be to maintain the EME principle **simplicity** in light of the extremely complicated battle field scenarios and military equipment currently in place or on the near horizon. It is no longer adequate to be consciencious and do the best job for the task at hand. There must also be a conscious awareness and understanding of how each player fits into the "system". In bygone days local SOP's and drills were developed so when the bombs dropped and all conditions were right to panic, the daily routines could be regimented and thus carried people through to accomplish the aim. That aspect will never change, however with the higher degree of required interaction at all levels of command, all local actions across the system must be coordinated and reflect a thread of commonality throughout the whole system. The local SOP's and drills, like never before, must therefore be common at every local level, especially in those areas which impact on the whole system.

This is based on the premise that in the Land Maintenance System the way maintenance is done at the local level is identical at every location; whether it be in garrison or field. The ways and means of gathering information are also constant, as well as the manner in which information is reported. From the individual person point of view, it provides a common thread of understanding and knowledge of the system no matter where the posting. It eliminates the need for new players at each location to relearn the system requirements. From the system point of view, having commonality throughout the system not only ensures personnel can be posted from the field to Base, and visa versa, without having to undergo a complete metamorphasis, but acknowledges through the union of all players in the system, ideas can be incorporated for the betterment of the system — thus helping maintain the EME aim of training for war.

With the increasing importance of a system's approach being introduced into the maintenance business, leadership has also gone through an evolutionary change. You cannot provide leadership to a **system** therefore the words management, manager and manage have crept into the military vocabulary. These new words do not mean leadership is passe; far from it, leadership in its traditional sense will still be a vital part of the military. As JD Batten's explanation of management shows:

> **Management is a Simple Thing**
>
> Management with emphasis on motivation is effective management. It need not and should not be complicated. One of the fallacies of our modern age is that a process or a thing must be either expensive or complex — and preferably both — to be worthwhile. Yet from the beginning of recorded history the greatest breakthroughs in human understanding have been brought about by two major forces.
>
> 1. The Search for truth and its application, and
> 2. An intense desire to reduce complexity to simplicity.

Bureaucracy means by definition . . . by central administration. It has been popularized in recent years to denote something which perpetuates itself, and in the process, masks its original purpose through feeding upon itself. Within the military, the latter use of the meaning is seen as a means of undermining the collective energies of the system. There must be a consorted effort to minimize bureaucratic creep as our effectiveness as a force hinges on our adherence to the basic principles of foresight, flexibility, coordination, cooperation, economy, stability, simplicity and protection. In order for any procedure to have value it must foremost have an aim. Once procedures are put in place they must be reviewed on a regular basis to ensure the procedure remains true to the aim. The review should not only cover the written work, but should be reviewed with every player to confirm the procedure allows for the attainment of the desired result.

Most often the frustrations of bureaucracy are seen through the eyes of the victim. That is to say bureaucracy is hardly ever seen as a thing we do to ourselves but can be readily identifiable should it be imposed. In fact, any local procedure can lose sight of the original aim and be developed into a monster; the designer of which will defend to the death and the implementors will always consider to be a waste of time. Having to initiate a data gathering procedure to monitor a particular problem, for example, and not rescinding it on rectifying the problem may result in the establishment of a bureaucratic procedure. Not trusting the results of someone elses efforts, and instituting your own data gathering mechanism can also result in bureaucratic frustrations being felt by all concerned. The balance therefore lies in maximizing the use of the system in being as an aid and continued dialogue with the key players. Should there be a requirement which goes beyond the parameters of the system, the instigator must have the confidence in the implemented procedure that anyone in the system with a similar problem would resolve it in a similar manner. It follows therefore that the biggest stumbling block in identifying the existence of bureaucratic procedures lies in self-admission and subsequent acknowledgement we all are potential instigators.

In many instances bureaucratic procedures can be viewed as artificial barriers between upper and lower management. A procedure which always requires an explanation when the data is reviewed might better serve the problem should it be substituted with regular briefings. Having supervisors express their problems through verbal communication is an invaluable means of building team spirit and cohesion, in that, everyone involved sees they are a part of the team approach to problem solving and more importantly they see their opinions count.

The following is a representative list of signs which can lead to bureaucratic procedures being put in place:

1. Data gathered on a daily basis for management purposes and no one reviews it.
2. A procedure implemented for monitoring EDD for repair parts and it evolves into including all status changes routinely generated by CFSS.
3. High VOR reflected on VOR Report and BTn do not provide priorities of details on either a weekly or daily basis.
4. Reporting procedures indicate parts problems and nothing done other than point a finger at BSup.
5. A high VOR and the solution was to give BTn the weekly status of vehicles in for repairs (w/parts, w/labour, etc).
6. After CF1184's are completed and distributed, B Maint does nothing other than PA.
7. Target Date Reports being gathered by both the Control Office and each Shop Supervisor.
8. Secondline Vehicle Shop supervisors preparing VOR status reports.

With any resource which must be controlled to attain the expected or desired result, there are a number of factors that have varying degrees of impact. Should the resource include a mixture of human and material things, coupled with a multilayered hierarchy, the system must allow the human element to follow a global predictable path of interactions. This will involve all the skills and abilities of leadership to extract the required responses. It will also require the development of processes and procedures resulting in a degree of management being brought into play. Couple all this together with the human tendency to complicate matters with bureaucratic regulations and the results can predictably show Murphy's law can play a major part. Without an overall system, skilled people, known procedures and a modicum of checks and balances, resources cannot be utilized to their optimum extent possible. The maintenance business within the EME world involves all these factors and they must be balanced in order that equipment and resources are ready for their respective missions. None of which could happen if leadership, management and dedication to a unified system are not balanced.

FROM MARITIME COMMAND

BEME Workshop – CFB Esquimalt

by Lt R. Luden

There is one Base EME workshop that is different from all others in Canada. It is unique because of its many varied customers and the functions it performs. I am referring to the BEME Workshop at CFB Esquimalt.

It is a workshop of intermediate size, between 50 and 60 personnel, and is dispersed in five different locations. The HQ and main BEME workshop are located next door to Workpoint Barracks which houses 3 PPCLI. That is where all FCS, weapons, and second level vehicle repairs are done as well as body work and machining. The paint shop is located with the PPCLI first level workshop. Vehicle servicing and first level repairs are done at our building in the naval dockyard, about 3 kms from BEME HQ. In addition, there are two 2-man detachments: one in Rocky Point (26 kms away) and one in Nanaimo (118 kms away). Being so spread out makes work challenging but it is the many units that we serve that keep it exciting.

The BEME workshop in CFB Esquimalt is the only one that serves a regular force infantry battalion and a combination of the Navy, the Reserves and the cadet units. It is not uncommon to see 5/4-ton truck, AVGP's and outboard motors in the same lot. This unique mix of customers keeps us on our toes and is good experience for everyone, especially for those in contact with the customers themselves.

For the 3 PPCLI, we do the second level repairs and all FCS and weapons repairs. For CFB Esquimalt, meaning the Navy, we do first and second level repairs on all kinds of vehicles and equipment from staff cars to outboard motors. The workshop has even taught OJT for the Fleet Diving Unit for familiarization on outboard motors. The workshop

supports five Reserve Units. They are:

a) Canadian Scottish Regiment
b) Victoria Militia HQ
c) 5th Field Battery
d) 11 Medical Coy
e) 11 Service Battalion

The workshop provided the Reserve Units with a significant amount of manpower for military exercises during FY 88/89. The total time that vehicle techs and weapons techs worked with them amounted to 75 man days. In addition, the lieutenant and a corporal vehicle tech accompanied the Militia to CFB Wainwright for 2 1/2 weeks during MILCON. We liaise with these Reserve units continually and our support for them is a significant fraction of our total workload.

But if anyone should think that life at BEME CFB Esquimalt is all work and no play they are sadly mistaken. We maintain a fairly high emphasis on sports events. We sent a curling team to CFB Penhold for the 1989 Bonspiel. We sent a seven man team to Courtney, BC (just outside Comox) for the annual Snow to Surf competition. It is a relay race involving downhill skiing, cross-country skiing, running, cycling and canoeing. We also participated in the Base floorhockey and softball tournaments. In addition, military personnel participate in regular PT periods three times a week. Workshop personnel participate as well in a number of social activities. They include a Christmas party and an annual summer picnic.

The "raison d'être" of any BEME workshop, however, is not sports or social activities but production, and this is the area where the BEME personnel of CFB Esquimalt excel. They have a reputation for getting the job done even under extreme time pressure. Further evidence of a high level of technical skill is the fact that 5 suggestion awards have been awarded to BEME personnel of CFB Esquimalt since December 1987. Mr. Geoff Dobinson (in photo), a civilian vehicle mechanic, received two of those suggestion awards.

Staffing

As in every unit during posting season, there were many staff changes. Major Geoff McClelland, the BEMEO, took his retirement in late June 1989 and now resides in Victoria. The new BEMEO is Capt. Don MacLean, posted in from NDHQ Ottawa. A new FCS/Electronic W.O., W.O. Kostamo, has replaced W.O. King who has been posted to Ottawa. The chief clerk, Sgt. Plant, has been posted to Ottawa and her replacement is Sgt. Jones from CFB Edmonton. Several other personnel have rotated in and out as well, making the military staff here almost like a brand new crew.

OSEER

During the fall of 1989, CFB Esquimalt underwent an OSEER of which BEME took part. Many new personnel were proposed as well as upgrading the BEMEO to a Major and the Control Officer to a C.W.O. It should prove to be interesting how the results of these proposals will change the BEME's organization in the future. The workload is steadily increasing and new technology is constantly evolving, making it more important than ever before to have a sufficient number of highly qualified technicians.

Conclusion

The Base EME workshop at CFB Esquimalt is a relatively small but busy workshop that serves a unique variety of customers. It is an excellent posting for anyone desiring a challenge as well as a chance to live in one of Canada's prettiest cities.

The personnel is Base EME Workshop Esquimalt take great pride in their support role of the West Coast Navy, the 3 PPCLI, and the numerous other units requiring EME services. Aye, aye, the jobs are definitely different because of the variety of customers and equipment, but the personnel at EME Workshop Esquimalt thrive on the challenge.

Arte et Marte.

CFB Halifax Base Electrical and Mechanical Engineering Section

Civilian Apprentice Training Program

A situation which many medium and large sized static EME Workshops across Canada experience is that the civilian workforce average age keeps growing without an offset of younger entry level tradesmen. This article deals with a plan put in place in 1988 by the BEMEO at CFB Halifax, Major Gary Ross, to curtail the growth of the workshop civilian employee average age and to reverse the trend. In a nutshell, the Plan called for the establishment of a civilian apprentice training program which is commonplace at 202 Workshop and at the Ship Repair Unit (Atlantic).

The BEME Section started its Civilian Apprentice Training Program in May 88 with the employment of four (4) vehicle mechanic apprentices and two (2) painter/autobody worker apprentices. The six (6) apprentices are being trained on the job by qualified workshop journeyman tradesmen.

Apprentice training in Nova Scotia, as is the case with all provinces in Canada, couples practical training at a workplace with formalized classroom training at an educational institute. In the case of the vehicle mechanic apprentices, the formal training consists of six sessions at the Nova Scotia Institute of Technology (NSIT), Halifax for a period of six (6) weeks each. The six (6) sessions are spread over a timespan of four (4) years. Similarly, the Paint/Autobody workers cover a Module type training program but do their formal classroom training at the University College of Cape Breton in Sydney, N.S.

To qualify as journeymen, each apprentice must successfully complete the following:

a. the six (6) module training units at their respective educational institute;

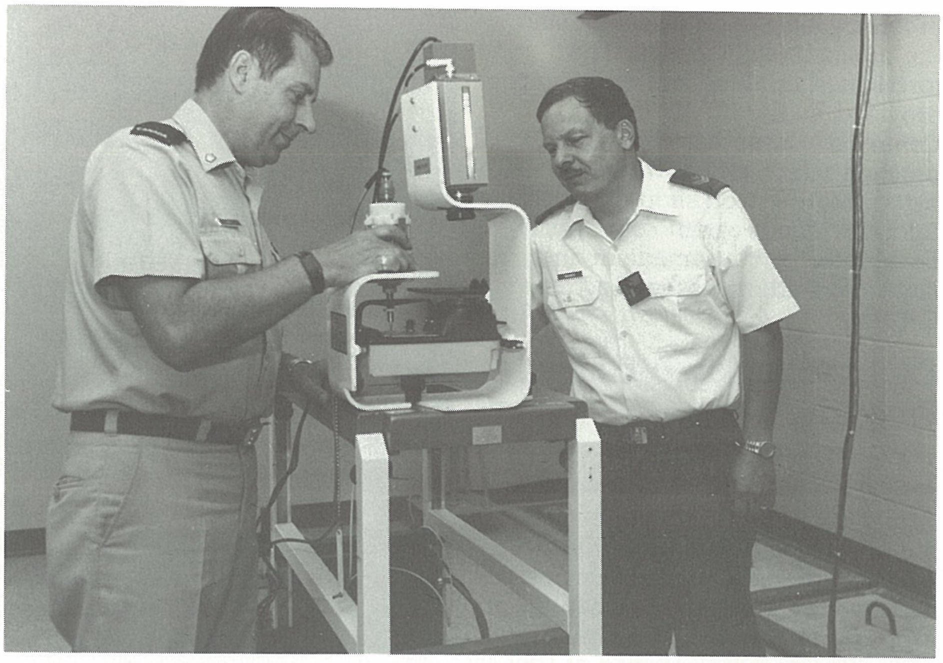
b. 8000 hours of hands-on experience in their work field; and

c. pass a written exam given at the end of the formal and practical training.

At the time of the writing of this article, the six (6) apprentices at the BEME Section have been employed for 15 months. The four (4) vehicle mechanic apprentices have completed one six week training session at NSIT while the Painters/Autobody worker apprentices were scheduled to take their first session in Cape Breton in Oct 89.

Arrangements for sending the Apprentices to their formal training is made through the Nova Scotia Ministry of Labour, Apprentice Training Division. This Division administers and governs the requirements for Apprentice Training. A Counsellor from the Apprentice Training Division is assigned to coordinate the programs of the apprentices in the Workshop. Within the BEME Section Command Group, the Workshop Sgt Major is responsible for ensuring that the apprentices are receiving appropriate training. He is also the liaison person with the Counsellor from the Apprentice Training Division.

The Apprentice Training Program at the BEME Section falls under the program title of General Labour-Apprentice Training Program (GL-ATP). This is a new program started at CFB Halifax to encompass all the non-Ship Repair Unit Atlantic (SRU(A) trades.



WO Amiro and MCpl Wagner mounting a IM 5019 Radiac Meter in the Radiac Room in preparation for calibration.

Performing a Radiac Meter Calibration. This procedure is conducted by remote controls and by observing on the screen of a TV monitor.

There are many advantages to the apprentice training program. For example, qualified journeymen from the program will be able to compete for vacant positions within the Workshop. This is particularly attractive since it allows for Workshop trained apprentices to become part of the permanent team and to bring with them youth and up-to-date training. This helps to create a stable Section Workforce and will stop the growth of the average workforce age and eventually will reduce it. As a final advantage, the apprentices provide person years of direct labour which is above the establishment of the workplace.

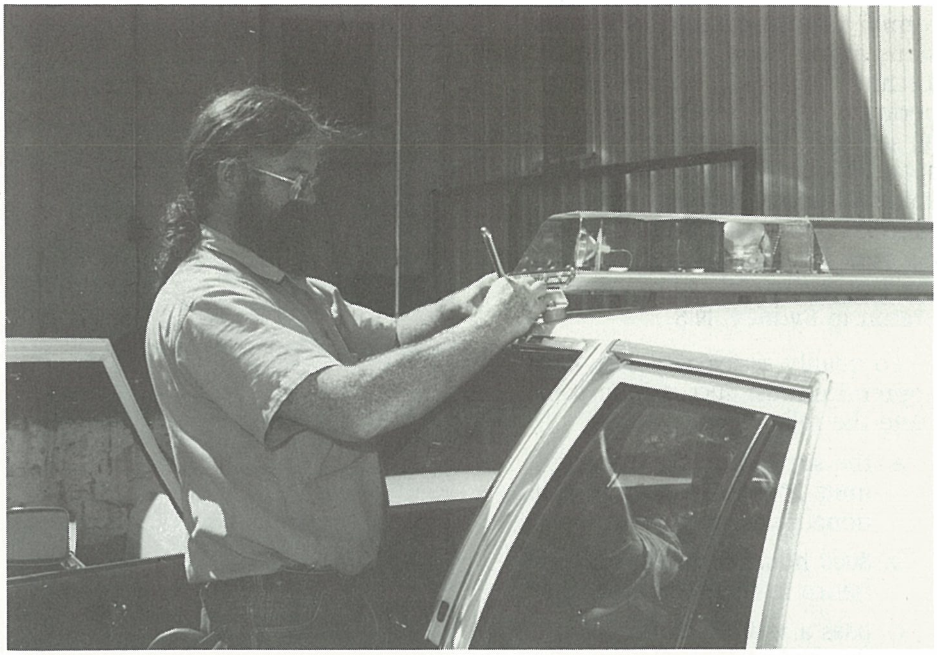
The BEME Section at CFB Halifax has created a very reputable apprentice training program in a short time period. The challenge of initiating the program has introduced some new problems and obstacles to the worklife of the Section but these problems have been overcome and the program is going well. The foresighted thinking and leadership provided by the BEME Section's Command Group has resulted in a program which will inject new blood into the workshop on a cyclical basis. The program could easily be adopted at other medium and large size static workshops across Canada.

Civilian Employee Equity Program

The Canadian Government has a special program called "Employment Equity" which has the aim of helping to provide meaningful work for lesser privileged Canadians such as those who are impaired or handicapped or a member of a visible minority. The BEME Section at CFB Halifax became involved in this program in 1987. The BEMEO, Maj Gary Ross, contacted the Civilian Personnel Officer and informed him that the BEME Section could accommodate Employment Equity technicians or apprentices in its workshop. This was the beginning of the Employment Equity program at the BEME Section. As a result, two technicians and one apprentice became employed at the BEME Section in Sep 87. The following is a description of each of the new employees:

Mr Mike Fitzgerald is an Electronics Technician and is employed in the Telecommunications Shop repairing electronic radios and TV equipment. Mr Fitzgerald is handicapped in both his legs, requires braces on them and uses canes to help him with his walking. At the work bench Mike is more than qualified to do the repair work expected of him. He uses his ingenuity to get the pieces of equipment from the receiving area over to his work bench. Instead of relying on others to do the job for him he'll use a steel stool on wheels to transport the equipment. Through application of techniques such as this, Mike is able to do more then his share of work.

The second technician, Ms Mamie Jaw was hired as an electrical tradeshelper and falls within the parameters of the Employee Equity Program since she was a female working in a trade traditionally dominated by male personnel. She was put to work in the Electrical Shop repairing electrical generators, vehicle starters and power tools. Mamie is a single mother who works during the day and takes care of her family after quitting time. Having an Employment Equity tradeshelper in this shop was



Mr Michael Fitzgerald Electronics Technician employed under the Employment Equity program at CFB Halifax. In this photo, Mr Fitzgerald, is installing the radio set and lighting system to a new Base MP Vehicle.

CFB Halifax BEME Section Civilian Apprentices. From left to right:
Mr David Porter, Vehicle Mechanical Apprentice
Mr Vincent Lang, Autobody Apprentice
Mr Richard Watson, Vehicle Mechanic Apprentice
Mr Dean Jackson, Vehicle Mechanic Apprentice

Missing: Mr Cecil Taylor, Autobody Apprentice
Mr John Lindsay, Vehicle Mechanic Apprentice

FROM HQ UNITED NATIONS TRANSITION ASSISTANCE GROUP — NAMIBIA

Maintenance in Namibia or Friday the Thirteenth part 99

by Major LJ Phillips,
SSO Maintenance HQ UNTAG

Introduction

A unique opportunity was recently presented to a group of international staff officers, collectively christened HQ United Nations Transition Assistance Group (UNTAG). The event was to open, operate and close down a major UN mission in twelve months. The "Aim" may not have been stated quite that way, but that too is reality.

In the Logistics Branch of HQ UNTAG, Canadians have personnel in most sections. The most fortunate group is the Maintenance Section. All are professional EME personnel and all are Canadians. This is the only section where all members are employed in a classification/trade-related job.

The work load is classic Canadian, cutting across NDHQ, Command and Brigade functions. We act as Project Managers, LCMMs, initiate and conduct staff inspections and Annual Technical Inspections (ATI). This report will focus on four areas; the UNTAG maintenance system, procurement of major equipments, the mine protected vehicle (MPV) fleet maintenance and the ATI.

Maintenance System

There are about seven countries which contribute formed units to UNTAG; infantry battalions — Malaysia, Kenya and Finland, engineer squadron — Australia, administration and movement control units — Denmark, and logistics support units (supply, transport and maintenance) — Poland and Canada. Switzerland provides a Medical unit, most of whom are civilians. Originally a Swedish Maintenance Company was scheduled in the order of battle. What arrived were German civilian mechanics who were recruited by German government aid and volunteer agencies. As some of these technicians joined this organization as an alternative to military duty, their services were lost to the UNTAG Military.

Logistically, Namibia is divided into two areas of responsibility. Deployed in the Northern sector are the Malaysian, Finnish, Australian, Italian, Polish and most of the Swiss Medical personnel and Military Observers. The Polish Logistics Battalion (supply and transport) is responsible for this grouping. Deployed in the Central and Southern sectors are the Kenyans, Spaniards, Canadians, some Swiss, Military Observers and UNTAG Military HQ. 89 Canadian Logistics Unit (supply, transport and maintenance) is responsible for this grouping. As the maintenance organization for the Northern sector did not arrive, the Canadian maintenance rôle, including recovery, was subsequently expanded to include the whole country.

Each military unit was expected to arrive with a first and second line maintenance capability. Within reason, each country did. This left the only second line maintenance organization, 89 Canadian Logistics Unit, with largely a back-up rôle (see dependency list). Despite this limited rôle it quickly became apparent that the Canadian Maintenance Platoon had neither the equipment nor the manpower to function properly. Subsequently, contracts were set up with civilian agencies for the repair and servicing of tires, hydraulics, auto glass, engines, gearboxes and axles, clutches and brakes, body repair, auto electrical, and diesel and gas fuel systems.

When a repair was beyond unit capability, it was backloaded, on call-in, to 89 CLU. When repair parts were available, they accompanied the equipment. Repair parts for most vehicles such as Land Rovers, Mercedes and Bedfords were available in country. For these, direct provisioning contracts were established with major suppliers. For unique equipment, requests for repair parts were sent via UNNY to home country under cover of a Letter Of Assist. Because of UN red-tape this process takes a great deal of time. To date, very little has been received from Letter of Assist requests. For repairs beyond 89 CLU's capability, the equipment was sent to one of the civilian contractors already mentioned. For contracts in the North, control was still maintained through 89 CLU.

Procurement of Major Equipments

The second line units had received instructions from UNNY, regarding which vehicles to bring to the mission. The Polish Logistics Battalion arrived with most of their heavy vehicles and no light vehicles, whereas 89 CLU arrived with few heavy vehicles and most of their light vehicles. The missing vehicles had been generally identified and budgeted for. After purchasing six large buses UNNY decided that lead times were too great and that the necessary heavy equipment should be rented in Namibia. This was the first of many cases where the HQ Maintenance staff just happened to be in the office when a small crisis arose. We were tasked to identify requirements and sources and staff the procurement documents. The "fleet" finally consisted of five recovery vehicles, three refrigerated vehicles, six medium buses and twenty-seven MPVs. Some were purchased, some rented; most were acquired "sight unseen".

To round this topic off we were also responsible to have acceptance checks done (89 CLU), ensure distribution and complete the paper work so vendors could get paid.

Mine Protected Vehicles

The MPV fleet maintenance presented interesting challenges. The first challenge was to find the vehicles. Thirty "Buffels" (troop carriers) and an assortment of "Samils" (logistics vehicles) had been taken over from the South African Defence Force (SADF) and distributed with virtually no hand-over or record keeping. Twenty-nine Buffels were found fairly quickly. The thirtieth showed up three months later. It had been sitting in the UN civilian Motor Transport Garage and only when they finally realized they had no use for it, handed it over. Twenty-four "Çasspirs" (troop carriers) had been leased in two batches from the South West African Police Force (SWAPOL). These were initially for use by the UN Civil Police (CIVPOL). During the election week, the military finally were issued seven. Again, the first ten were taken over without an in-inspection. The CIVPOL had no mechanics and the Casspirs never turned a wheel for weeks. The rental fees were being paid.

The "Wolf" fleet of ten vehicles (troop carriers) was a different story. They were purchased and manufactured in Namibia. A mini Project Management team was set up and the Wolfs were delivered on time with a full maintenance plan in place, including warranty work.

The maintenance plan for this fleet was driven by contract agreements, geography and the UN financial system. The Casspir agreement stipulated that only three civilian companies could work on the Casspir. All the Casspirs were stationed in two locations in the far north and only one of the civilian companies had facilities in the area. The UN financial system limits the funding level which can be approved in-theatre. Above this, approval must be sought from UNNY, another time delay. Separate maintenance and service contracts were set up with one civilian company, each within the local approval limit. Additionally, separate contracts were established for repair parts for these vehicles. When the vehicles require work, either repair or servicing, and the work involved will take over an hour, an estimate is sent by Fax to the SSO Maintenance staff who Fax back the reply. Repairs to engines and major assemblies are on a "strip and quote" basis.

ATI

Inspections are done in other UN missions, therefore the concept was not new. The Maintenance MWO, MWO Laaja, was tasked to arrange and conduct the whole thing. This included writing the Logistics Directive, scheduling the units, forming the team and taking care of the myriad administrative details. Distance was the biggest problem. To inspect 35% of the vehicles of the eight units, the team travelled five thousand kilometres.

An international team of eight vehicle technicians inspected on average, twenty-one vehicles per day. Lasting for the month of September, the inspections were thorough and honest, free and fair. Conducted as closely as possible to a Canadian ATI, each CO was debriefed after the unit had been inspected. The results ranged from very good to poor. The debriefing proved that every CO took the ATI very seriously.

Above and Beyond

This topic is included to expand on the "happened to be in the office" theme. Early in the mission, there was a problem with gasoline in Namibia. This was neither critical nor protracted. Orders were issued for the establishment of force and unit reserves and establishment of a bulk POL delivery system to military units. After lengthy delays, the contract was awarded to Mobil.

The exercise was to establish that products were required, where they were required, what facilities existed and what facilities were required. This time, Capt Dany Proulx was in the office. He was tasked to perform what is normally a supply function. Accompanied by two representatives from Mobil and a Supply Technician from 89 CLU, he toured the country for the next week. He returned looking very pale; the civvies drove and knew no speed limits, regardless of road conditions (or lack of roads).

Capt Proulx's plan met everyone's approval and was soon in place. Gasoline is flowing to the units. As a bonus Dany now overseas the running of a gas station at HQ UNTAG. No-one else would do it and no-one would order anyone else to do it.

The other item worth mentioning was a weapons project. Although a maintenance subject the long term involvement of the SSO Maintenance staff was unusual. The Force Commander discovered about 7000 Heckler and Koch G-3s in storage. Most were in deplorable condition and we were tasked to set up a project to clean, classify and preserve these weapons. We ended up with a platoon of Kenyan riflemen and several Kenyan armourers. An UNMO (military observer) was also involved as he had to lock and un-lock the building each day. It was interesting to see a project from a staff check through to plan and implementation. Seven weeks later the task was complete. We visited the workshop on a daily basis, spot checked the results and correlated a four-way tally to ensure all weapons were accounted for. Some interesting occurrences were bullets jammed in the barrel, live rounds jammed in the breach and many home-made field repairs (pistol grips, complete butts etc).

Conclusion

The maintenance system in Namibia is a hodge-podge resulting from pre-mission planning, UN restrictive practices and the equipment and technical manpower that actually arrived on the ground. Due to a lack of understanding of the UN system (and a lack of willingness to educate us until we had made a mistake) we groped in the dark for many weeks. By hook and by crook we did get the system in place and it is now running relatively smoothly. Of course as soon as it was organized it was time to start planning for the dismantling.

All the Maintenance Staff have enjoyed the challenges of UNTAG. I recommend this type of job if you are an over-the-hill major trying to evade Ottawa, a new captain on second posting or an MWO trying to decide on his future.

Recommendations

If Canada is to get involved in another UN mission when a second line maintenance organization is called for, the following recommendations are offered;

a. *Recce* A recce by a maintenance planner is most important. A listing must be made by company and location of what types of repairs are available in country. Of importance is the quality of work and the source (in or out of country) of repair parts. An indication of willingness and UN priority, vis-à-vis regular customers would be helpful. A listing of recovery resources by location, type, capacity and recovery distance would be very useful.

b. *Composition of Maintenance Unit* An early indication of composition of units from contributing nations is essential. A listing of major equipments by types (specifically country of manufacture) is also essential. This must be dove-tailed with the agreed listing of UN vehicles to be purchased. The remaining factors are the capabilities of the unit's maintenance organizations and geography of the mission area. The maintenance planners can now correlate this information with that found in the recce and plan a proper force maintenance organization. Seasonal variations must also be considered.

c. *Maintenance Staff* If Canada is to provide the SSO Maintenance, it should insist all of the maintenance staff be Canadian.

89 CLU DEPENDANCY LIST-AMENDMENT 1

VEHICLES

Support Level Organization	Level I	Level II	Back-up Level II	Recovery First-Line	Recovery Second Line
AUSENG			X		X
AUSENG (W) (note 2)	X	X		X	X
BRIT SIG			X		X
89 CLU	X	X		X	X
DANCON		X		X	X
FORCE DEPOT			X	X	X
FINBATT			X		X
ITALAIR			X	X	X
KENBATT		X (Note 1)	X		X
MALBATT		X	X		X
MONITORS	X (Note 4)	X	X		X
MOV CON UNIT		X		X	X
POLICE	X (Note 4)	X	X		X
POLISH LOG Bn			X		X
POSTAL UNIT		X		X	X
HQ UNTAG	X	X	X	X	X
PROPERTY SURVEY BOARD	X (Note 3)				
Swiss Med		X			X

Notes: 1. Automatic transmissions only
2. For mil vehicles only. This applies to Contingent vehicles which are permanently used in UNTAG HQ and/or when normal maintenance unit is geographically removed.
3. Property Survey board requires serviceability checks only.
4. For mil pattern vehicles only where Civ resources are not avail.

89 CLU DEPENDANCY LIST AMENDMENT 1

NON-VEHICLE

Support Level	Weapons	Electronics	Radio	Material (Note 3)	R M	Misc	(Note 2)
Organization	1 II II+	1 II II+	1 II II+	1 II II+	1 II II+	1 II II+	(Note 1)
AUSENG		X	X	X		X	
AUSENG (W)		XX	X	X		XX	
BRITSIG		X		X	X	X	
89 CLU	XX	XX	XX	XX	XX	XX	
DANCON		X	X	XX		XX	
FORCE DEPOT		XX		XX		XX	
FINBATT		X	X	X	X	X	
ITALAIR		XX	X	XX		XX	
KENBATT		X	X	XX	XX	XX	
MALBATT		X	X	X	X	X	
MONITORS		XX		XX	XX	XX	
POLICE		XX		XX	XX	XX	
POL LOG BN				X		X	
POSTAL UNIT		XX	X	XX		XX	
PROPERTY SURVEY		X	X	X	X	X	(Note 4)
HQ UNTAG		X		X		XX	

Notes: 1. I — level I
II — level II
II+ — back-up level II
2. Includes locks, safes, heaters etc.
3. Includes canvas, welding, painting
4. Requires serviceability checks only

The White Wolf of Namibia

by Maj LJ Phillips

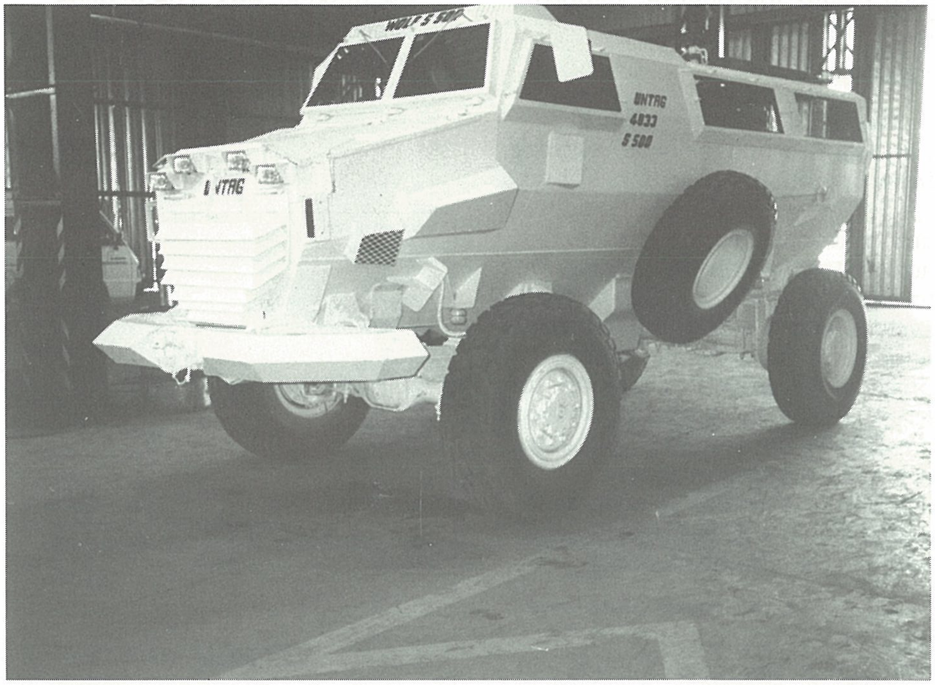
When one thinks of Namibia, it is easy to imagine hyenas and jackals but Wolfs, really, and especially white ones. The United Nations Transitional Assistance Group (UNTAG) Wolf is a four-wheeled mine and small arms protected vehicle (MPV), designed and built by Windhoeker Maschinenfabrik (WMF) in Windhoek, South West Africa/Namibia.

This vehicle represents the latest in the evolutionary chain for the answer to the requirement for a transport vehicle which can protect its cargo in the bush war environment. The favourite weapon of the terrorists during the various African "wars for independence" was the land mine. Above all in bush warfare, the mine is a psychological weapon which is completely indiscriminate. Military vehicles, buses, even family cars and large animals will set off the land mine.

In the early '70s the Rhodesian (now Zimbabwean) Security Forces started "running" over mines along the border with Portuguese Mozambique. At the same time, the South Africans were experiencing similar problems in the North East finger of Namibia, the Caprivi Strip. The Rhodesians, always short of money and materials, adapted Land Rovers and Bedfords by fitting sand bags, water-filled tins and old conveyor belts etc, then concentrated on V hulls. The South Africans, mainly the Defence Research Unit, concentrated on V hulls for Ford 250s and then Unimogs.

The V shaped hull was the answer. It deflected the blast and safeguarded the cargo. As the vehicle speed increased, so did the chance of rolling the vehicle, hence harnesses were fitted for driver and passengers.

The next step in the evolutionary design was to minimize damage to the running gear when a mine was detonated. This saw the introduction of the monocoque concept. This



THE WOLF PROJECT MANAGEMENT TEAM

Left to right:
Maj LJ Phillips — PM, Insp Johansen — UNCIVPOL, Capt Proulx — SO Maint, Mr H Kogl — Managing Director WMF, Mr ARussell–Procurement Officer UNTAG, MWO R Laaja — MWO Maint.

is basically a V shaped hull, with the running gear bolted on. An explosion would blow away one wheel station, allowing quick and inexpensive repairs. By the end of the Rhodesian war, although a great deal of development had been done, a proper military cross-country, mine and small arms protected, section vehicle was not yet in production.

The Buffel, an MPV based on the Unimog chassis, was the first vehicle which went into production purpose built to fill this gap. Like so many other good solutions, private individuals funded, built and tested this vehicle; most of the time against the wishes of officialdom. Several thousand were built and used by the South African Defence Force/South West African Territorial Force between 1978 and April 1989.

When UNTAG started operating in March 1989, there was a perceived threat from mines in the old "operational areas". Because they were available, surplus to SADF use and as a quick solution to this threat, thirty Buffels were leased from the SADF. They are used regularly by the Malaysian Infantry Battalion carrying out routine patrols. They are also used by the Australian Engineers. Due to the age of the vehicle, the limited availability of spare parts is a real problem. The VOR rate is currently about 30%.

A second development in South Africa was proceeding in parallel with, albeit later than the Buffel; that of a MPV based on the monocoque concept. Characteristically, with the Buffel accepted and in service, although with a limited in-service life span, the monocoque design was also spurned by officialdom. This time the torch was carried by the Defence Research Unit and private individuals. This resulted in the most successful Casspir vehicle, a true monocoque MPV. In 1981, the vehicle was put into production by the South African Police, not the Army.

This vehicle combines excellent cross-country capability and high sustainable speeds. It is crewed by a driver, a commander/gunner and can carry twelve combat ready passengers. In the hands of Koevoet (the Counter Insurgency unit of the South West African Police (SWAPOL) mounting up to a 20mm Hispano cannon, this vehicle became a feared symbol of SA authority amongst the Northern tribes of Namibia. The SWATF/SADF finally did purchase Casspirs but the numbers have not been disclosed.

This finally brings us to the Wolf. Again, its development was in the private sector. The concept is based on the proven Casspir design. This has been honed by the experience garnered in fighting the South West African People's Organization (PLAN) fighters in Northern Namibia. The Turbo Wolf, as the production model was designated, was designed and produced by WMF in Windhoek, Namibia. Its cross-country capabilities are even better than those of the Casspir. Additional attention was given to the running gear and ease of repair and maintenance. The aspects of what we call Battle Damage Repair have been given particular attention. For example, a leaf spring can be rebuilt in the field in no time. A complete axle can be replaced in as little as two hours.

The UNTAG Wolf, the S-500, is so named because it is half a meter shorter and half a meter lower than the Turbo Wolf. The S-500 is powered by a MAN diesel turbo-charged, inter-cooled engine generating 200 HP. The manual synchromesh transmission incorporates twelve gears through a splitter box. The Wolf can gallop along at 110 kph, though the recommended top speed is 100 kph. All power V-train parts are supplied by MAN, Germany.

When the order was placed for the S-500, it had never been built. As it was an adaptation of a previously produced vehicle there was minimum risk involved. The only areas requiring modification were prop shaft lengths, leaf springs and air flow through the engine compartment and transmission.

A Project Management team was used to oversee production. The Project Manager was the SSO Maintenance, with technical input from the Maintenance staff. The user was represented by the United Nations Civilian Police and a member of the Procurement Section, kept the financial end kosher. The Managing Director of WMF and Pedaco Engineering (the local MAN representative) rounded out the team.

The first Wolf was accepted on 8 September, a mere two months after the contracts had been signed. Wolf number 10 was accepted on 9 November, the third day of elections. Nine had been delivered on time, one was a week late.

The White Wolf of UNTAG is a fast, reliable, small arms and mine protected vehicle. Its fantastic cross country capabilities and extremely long range make it the right vehicle for this mission.

FROM THE CFSEME

First New Building for CFSEME

by Capt D.C. Blake-Know

The Canadian Forces School of Electrical and Mechanical Engineering celebrated a significant event on the morning of Saturday, October 14. The School's first new building, the LeSueur Brodie Building was officially opened.

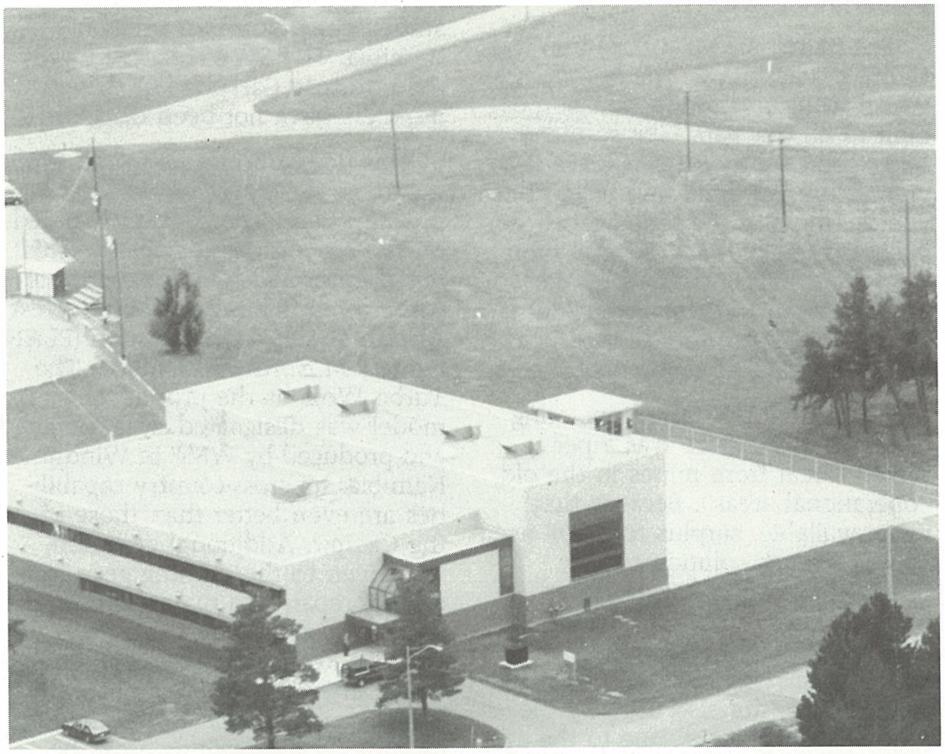
The principle guest was Mrs Althera Brodie, LCol Brodie's widow. Amongst the 100 guests were the Base Commander BGen Dziver, and the LEME Branch Advisor BGen Hanson as well as many who contributed to the project. The LEME Association was also well represented.

Addresses were given by BGen Dziver, the School Commandant Col Pergat, and the President of the LEME Association LCol (Ret'd) Felstead, followed by prayers from Padre Brown. Mrs Brodie then cut the ribbon, and after admiring the commemorative plaque toured the building and equipment demonstrations.

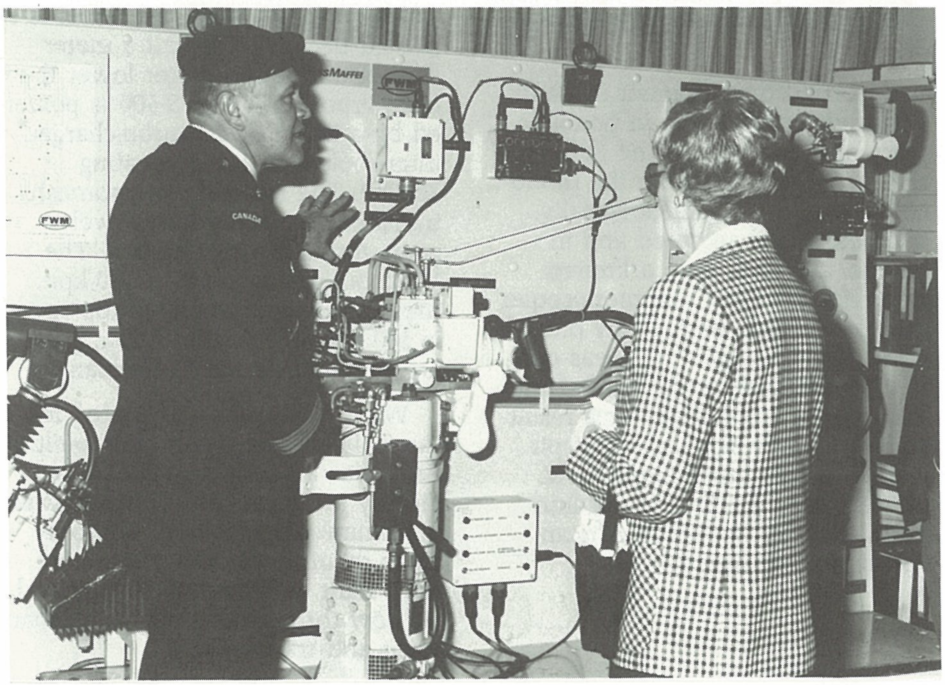
The LeSueur Brodie Building houses the Armaments Cell of Artisan Company Weapons and Fire Control Systems Platoon. The building provides almost 2,000 square meters of floor space including ten classrooms and a large workshop area with a 15 ton overhead crane capable of lifting a tank turred. The floor has been specially strengthened to support the weight of heavy armoured vehicles.

The building is used to train Weapons Technicians (Land). Students are taught many subjects including hydraulics and electrical systems, and trained on a variety of equipment including the Leopart Main Battle Tank, AVGP, TOW Under Armour Turret and 105mm howitzers.

The choice of the name for the building was done after careful



The LeSueur Brodie Building



Col V. Pergat explains the Leopard Main Battle Tank hydraulic and fire control systems to Mrs Brodie.

research into the various distinguished members of the LEME branch and its predecessors LORE and RCEME. LCol joined the militia in 1936 and served with the army at home and abroad during World War Two. He was one of the original members of the Royal Canadian Electrical and Mechanical Engineering (RCEME) Corps and served for many years after the war in the militia. He was the Honourary Secretary Treasurer of the RCEME, LORE and LEME Associations and chairman of the Conference of Defence Associations.

In December 1976 he was appointed to the order of Canada, invested as:

> *"An engineer who has rendered distinguished services to Canada in war and peace, and whose interest in military history has found expression in his many gifts to various museums in Canada."*

Lieutenant-Colonel Brodie died on 7 May 1988.

Mrs Althera Brodie cuts the official building opening ribbon as BGen R. Dziver, BGen J. Hanson and Col V. Pergat look on.

(CANADIAN FORCES PHOTO/
PHOTO DES FORCES CANADIENNES)

LCol LeSueur Brodie, OC, ED

Plans are already being made to extend the building to include Small Arms training. This would allow all Weapons training to be conducted under one roof and create room to expand the cramped facilities in Croil Hall. The LeSueur Brodie Building is an important addition to CFSEME's facilities and will improve training standards.

Trades Training at CFSEME

by LCol L.L. Hellemans

With the start of a new decade, it's an appropriate time to look back at the accomplishments of the last 10 years. We started the 1980's with an Occupational Analysis, which led to the present trade structure of Veh Tech, Wpns Tech, FCS Tech and Mat Tech. Lengthy and detailed staff work followed and resulted, in 1987, in a plan for the implementation of the required training. This plan contained the key statement that no new training was to be implemented until all the resources (manpower, facilities, training aids, etc) were in place. For this reason, it was decided to implement all new courses one Performance Objective (PO) or Enabling Objective (EO) at a time. Let's now look at where we stand at the end of this decade (ie Dec 1989).

Veh Tech

Course	PO's Implemented (1)	Remarks
QL 3	30 of 33	Remaining 3 PO's are either partly implemented or are waiting for facilities (2) or training aids.
QL 5	17 of 21	Remaining 4 are partly implemented and waiting for facilities or training aids.
QL 6	All	Will be monitored by Standards this year. (1990)

Wpns Tech

Course	PO's Implemented (1)	Remarks
QL 3	20 of 31	Remaining 11 are being re-written and will be incorporated by Summer 1990.
QL 5	3 of 23	Course will be implemented by Jan 1991 as only re-writes are required of remaining PO's.
QL 6	0 of 9	Course will be implemented by Summer 1990 as only re-writes are required.

FCS Tech

Course	PO's Implemented (1)	Remarks
QL 3	31 of 33	Remaining two are being considered for deletion (Maintain Meters and Gauges; Explain the Theory of Operation of Welding Equipment).
QL 5 (432)	6 of 14	Of the remaining eight, six are waiting for equipment and the last two will be included when the XG and XH courses are deleted (1994?)
QL 6 (432)	7 of 9	The remaining two are scheduled for implementation in 1990, on arrival of the training aids.
QL 5 (433)	15 of 16	The last one is expected to be in place in late 1990, on availability of equipment and facilities.
QL 6 (433)	All	

Mat Tech

Course	PO's Implemented	Remarks
QL 3	All	A minor adjustment is being proposed for these two courses.
QL 5	All	
QL 6	All	

LEME COMMON TRAINING

QL 3. The QL 3 Common has been implemented. For the future we are hoping to incorporate Drive Training, which is still given separately at CFSAL.

QL 5. The 1989 OSER approved staff to expand the course to 10 days, but provided no offsets. Until these are available, few changes will be made to the course.

QL 6. The course is fully implemented.

QL 7. The course is fully implemented.

The Future

We will continue to work at implementing PO's as a first priority, and at evaluating this training, once implemented, as a second priority. Of course, periodically our colleagues in DGLEM throw our schedule off by trying another piece of kit. Good staff work by both NDHQ and the School normally eliminates all of the problems of introduction. In summary, CFSEME confidently looks forward to a productive and busy year, by the end of which most of our new trades training will be in place.

NOTES — (1) Where a PO is **not** implemented yet, generally the old PO is in use.

(2) The new building is at present scheduled to open late in 1991.

CFSEME Vehicle Company

Vehicle Company has been maintaining a normal state of change in its continuing battle to keep up with technology and new acquisitions. As usual, while new equipment is procured and new test and procedures are developed, the old kit and methods are very slow to be phased out. This process ensures that new vehicle techs can still work with and for the old guard.

The company has undergone a few major operations in the last year, including an OSER, another change in OC (two since the last entry in the EME Journal) and word that the new Vehicle Company building is scheduled to be built in 1990/91.

The OSER made a few recommendations for organizational changes (as only the OSER team can), but the jury is still out on the final results. For this year, there are no startling changes on the ground.

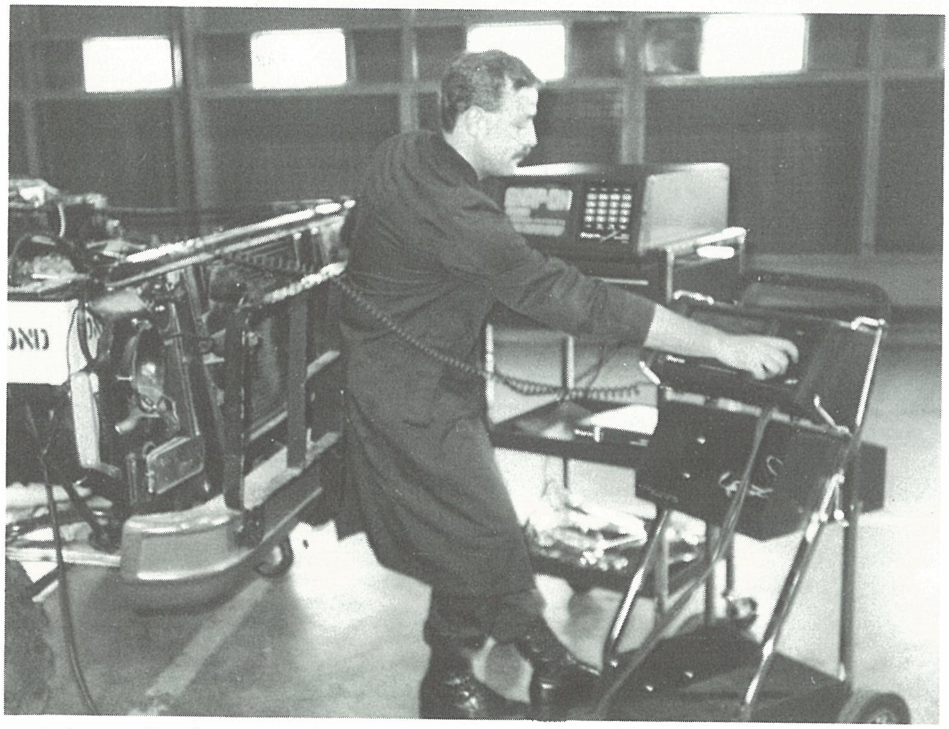
The new Vehicle Company building is being designed to replace all of the Vehicle Company buildings except for A-175 (Light AFV, EEM/AAGSE) and A-218 (Leopard/M109) and will take in the present building A-146 as part of its structure. The building in its present state of design is not modest and includes a circular headquarters wing (the bridge) and a line of classrooms on a hallway 125 meters long and over 5,000 square meters of lab and floor space. The fine tuning of internal wall locations is to be complete before Nov 1989 and construction is slated to begin in Spring 90. It has been a long time since conception, so everyone in the Company is keeping their fingers crossed in hopes of a timely completion.

The following updates are provided from the sections of Vehicle Company. Rest assured that through all the changes and all the predictions, Vehicle Company continues to produce a most capable and proud product, the Vehicle Technician.

Electrical Section

The instructors of the Electrical Section have been working overtime lately to become familiar with new test equipment, and to incorporate it into the lesson plans. The new equipment acquisitions consist of the Counsellor MT 1665 and the MT 1560 heavy duty AVR.

The Counsellor is a portable AC/DC powered digital oscilloscope, volt, dwell and tachometer. The Counsellor displays five waveform test screens and also three bar-graph screens; all having the capability of providing numerical data. The Counsellor's many special features makes diagnosis and troubleshooting efficient and accurate. One of the most valuable features is the memory, which allows the instructor and student to run through every waveform and test in the classroom from data collected up to three days prior.


MCpl Verville diagnosis faults in the electrical system utilizing the newly acquired test equipment.

The second new test equipment utilized in the Electrical Section is the AVR. It has the LCD display which makes it easy to read and also has voltage and current bar graphs. The AVR also includes a compact current probe and a load/time indicator which will display "15 seconds" when the maximum recommended load period has elapsed.

These new equipments incorporate many design features which make basic testing and detailed troubleshooting safer, faster, easier and more accurate. The big plus, of course, is that the students are utilizing state-of-the-art equipment and staying current with modern technology.

EPR Section

Engine Precision Rebuild Section has the responsibility for teaching QL3, QL5, QL6A and LEME officers the fundamentals of operating and repairing automotive gas and LPG powered engines.

One challenging task for QL5 students is the rebuilding of a Chev small block 350. QL3 students are instructed in the stripping and repair and re-assembly of the 1.7 litre VW engine head found on the ILTIS.

One of the newest acquisitions is the leakdown tester. Although not a new concept, it has been overlooked for many years in diagnosing engine faults. The correct use of this tester gives the Technician an accurate and specific indication of internal problems without any major tear down of the engine. This has proved enlightening for all students, including the more senior students on the QL6A courses.

MCpl Levesque, instructing QL3 students in the removal of a 1.76 L cylinder head.

Brakes and Steering

As many people are aware, the capability to perform 4-wheel alignments is a necessity in the industry today.

Brakes and Steering Cell has acquired some new state-of-the-art test equipment. These are, in fact, three computerized FMC 9000 series 4-wheel alignment systems and one Bear Dimension 4, 4-wheel alignment system. Along with these systems, the section procured four space saver hydraulic hoists, which have been perfectly levelled and each computer system calibrated to its respective hoist. This equipment enables the cell to align any passenger car or light duty truck and, if the computer doesn't have the information stored for a particular application, it can be inputted.

Thanks to the new computers, students are trained on some of the most advanced front-end and 4-wheel alignment equipment available on the market today.

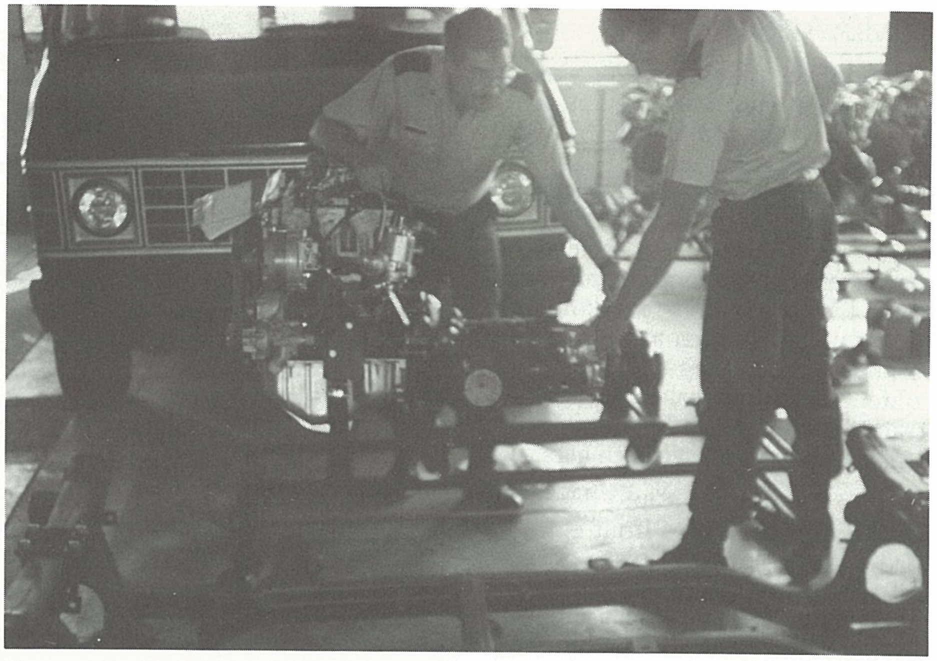
Power Train

Recently, Powertrain Section of CFSEME has been fortunate to acquire a burned-out ILTIS to use as a possible training aid. Initially the section had planned to salvage only a few components to use as training aids because of the poor condition of the vehicle. However, once the project was underway, members of the section began to pool their expertise and many ideas were generated.

The engine was disassembled and cleaned, and will shortly be installed with an electric motor so power can be transmitted to the transaxle assembly. Also, the transaxle and differential were rebuilt and cut away. All of this time consuming work was done by MCpl Truax, MCpl Hipwell and Cpl Clark. In addition, MCpl Deschene designed a stand on which to mount the operable training aid.

Although not yet completed, the staff has spent many hours developing a fully functional training aid complete with frame, wheels and steering. These efforts will assist students in visualizing and comprehending the important concepts of power train theory with the use of a simplified mock-up.

Remember, one section's junk may be another's treasure.

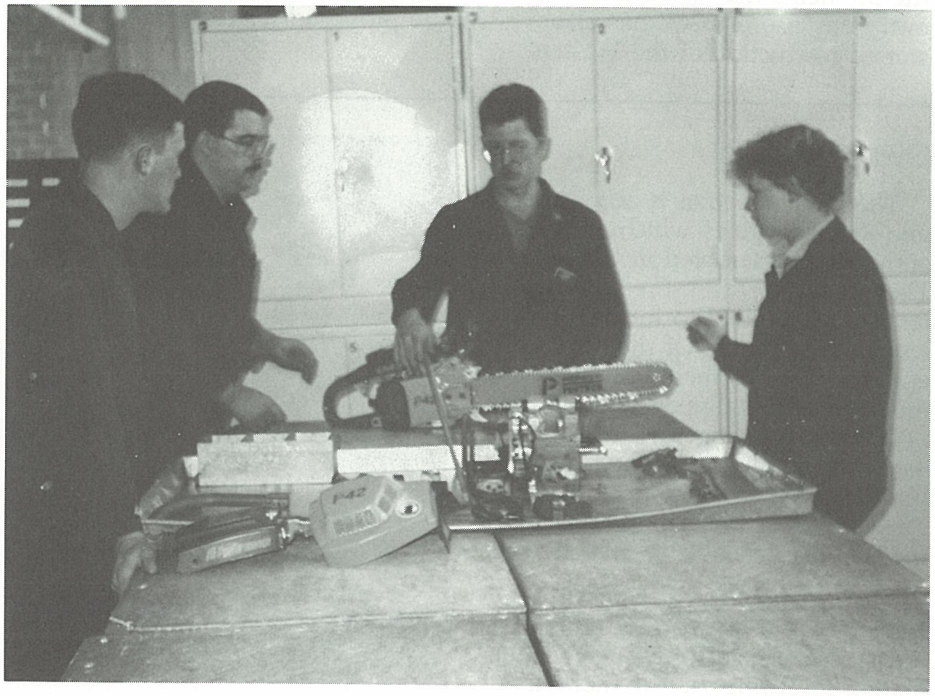


MCpl Cox readies the new dimension 4 bear alignment machine by selecting the appropriate input data for testing.

VMT — Servicing Section

These days so many changes are happening so quickly in the maintenance world, technicians find it difficult to keep abreast of current technology. To maintain the expertise of 411 tradesmen within these changing times, the Servicing Section of CFSEME has been busy introducing our students to the various types of personal heaters currently utilized in the field today. These include the 510c, the 100,000 btu and the 250,000 btu Vacan heater. In addition, a new small engine package is being introduced to the section to provide a wider and more professional range of service to the units. This will produce technicians capable of servicing, inspecting and repairing lawn mowers, snow blowers, chain saws and outboard motors.

The arrival of the new mathematics package in VMT has already undergone a few amendments. The high consumption of lead pencils and mechanical sharpeners by students has forced the incorporation of electronic calculators into the package.



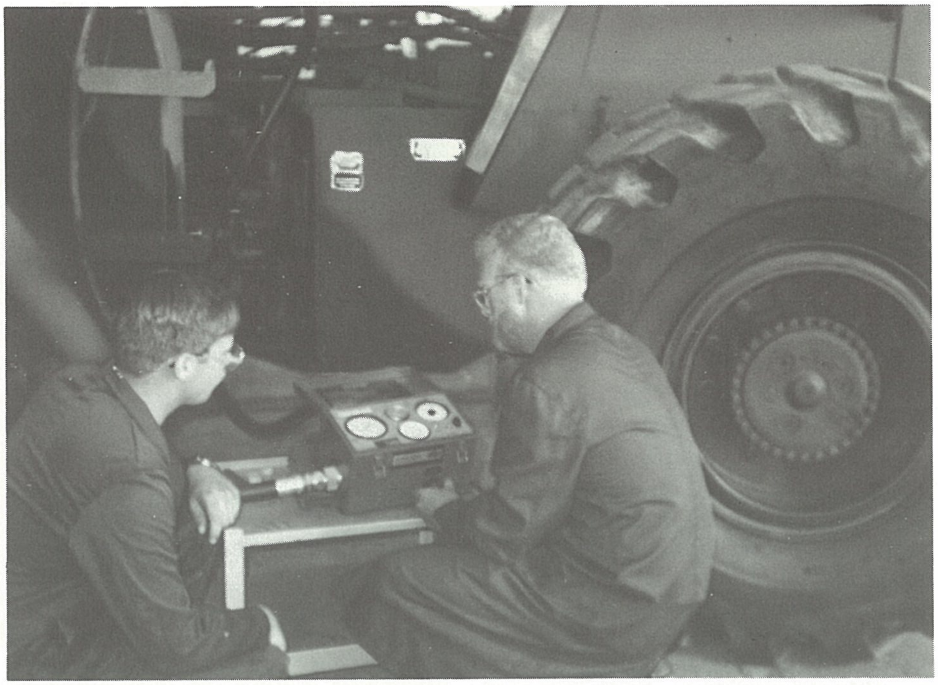
Sgt Demers explaining the maintenance and repair procedures for the P42 chain saw to EMERS students.

EEM/AAGSE

One of the many questions raised by students who have left this section is why not combine EEM and AAGSE. Many people who have come through our doors in the past will be happy to hear that their requests did not fall on deaf ears. Over the past 12 months many man hours have been spent working on the feasibility of such a move with respect to scheduling and course content. The proposal is now at Training System Headquarters for consideration; cross your fingers.

Since the last input into the EME Journal, the Case W24 front end loader was adopted in place of the old W124. Students enjoy working with this vehicle, especially while driving in the sand pit. The hydraulic flow tests performed on this vehicle have proved superior to its predecessor due to the accessability of its hydraulic components.

On the AAGSE side of the house, the section has acquired an MJ1-A serial stores lift truck that gives students insight into the performance of a hydrostatic drive system and the problems that could arise with every day use. AAGSE has also started instruction of the Walters 4500 crash truck, paying particular attention to the foam, air fire-fighting and pumping systems.



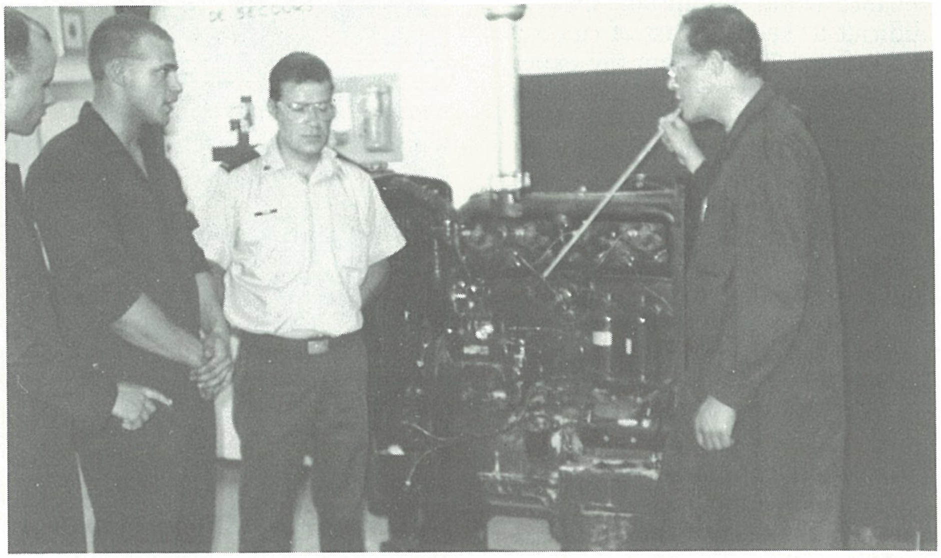
Cpl Lught demonstrating a hydraulic flow test on the W24 loader to new staff member, Cpl Flemington.

EEM/AAGSE continues to be a dynamic section due to the constant acquisition of new equipment and the proposed restructuring of various courses. Only time will tell whether students attending courses in this section, within the near future, will leave qualified both EEM/AAGSE.

Diesel Section

The Diesel Section is acquiring four Steyer engines which are presently being assembled in Kingston. They should provide the additional technology needed to further challenge the students. Of the four engines, three of them will be mounted and equipped with all the necessary apparatus for simulating operating conditions and one will be used as a demonstration model. These engines will definitely change the training available within the cell.

The instructors of the Diesel Section would like to say thank you to the members who provided information regarding the International Harvester UD14 six-cylinder gas/diesel engine which was published in the 1986 edition of the EME Journal. This engine was positively identified by two seasoned ex-MSE Techs who were trained to maintain this engine as part of a Group 1 MSE Tech Course. It was used in the IHC bulldozer, model TD14, which was in service with the RCAF from the late 50s to well into the mid-60s. Although the equipment is no longer in use, the engine is still a runner and well maintained within the cell.



Sgt Frigon observes as MCpl Johnson explains some of the unique operating characteristics of the UD14 gas/diesel engine to interested QL3 diesel students.

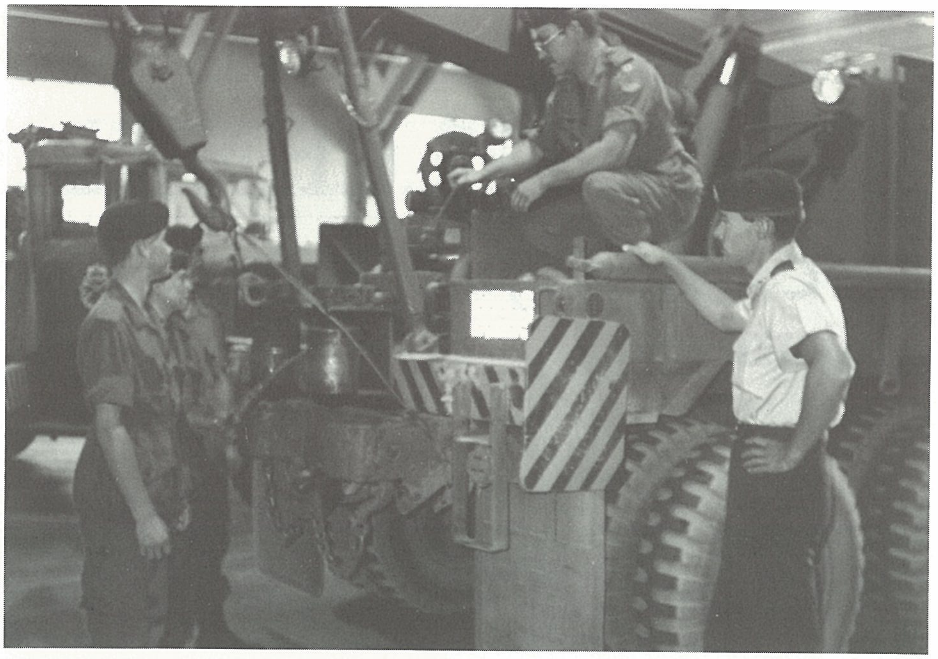
Recovery Section

Recovery techniques have not changed dramatically over the years. Whether is was a Group One Course, TQ3 or a QL3, digging in spades, replacing shear-pins and hauling cable have remained constant. If this scenario brings back fond memories, hang on to them, they are about to be shattered by the future in the form of the HLVW recovery variant.

The Recovery Section at CFSEME is slated to receive four such vehicles, and with the addition of two more diesel five tons, recovery training will be even more challenging! After delivery of the new vehicles, recovery training for QL3 and QL5 Veh Techs should certainly prove to be interesting, at the very least.

As for the M62 and M543, because of redistribution, they are not phased out yet; hence, training on them will continue.

However, it's refreshing to see Veh Tech recovery moving into the future with style.



MCpl Lemoine and MCpl Stone instructing EMERS students on the operation of the rear deck of the M-62 wrecker. These vehicles will be replaced in the near future with the HLVW recovery variant.

LAFV Section CFSEME

Greetings to our brother technicians in the field from the Light Armoured Fighting Vehicle Section at CFSEME. Since our last submission to the EME Journal, LAFV now holds two additional variants of the NTV; a personnel carrier and a TOW variant. The LAFV cell presently instructs two OSQ maintenance courses per year on this vehicle. The additional procurement of 400 NTVs, presently being manufactured by Foremost in Calgary, could possibly increase the course loadings depending on future commitments.

The LAV25 vehicle is expected to become the newest member of the LAFV cell and will be a welcome addition. Approximately 199 copies of the vehicle will be built in London, Ontario, at General Motors. It is similar to the AVGP with regard to its power plant, power train, and brake systems. The slight increase in body length, steering system, and an additional axle are some of the differences that will be addressed when instruction on the new vehicle begins within the LAFV cell. At present, it is undecided if the maintenance course on this vehicle will be added onto the existing QL5 package, or whether there will be an adjustment course provided to qualified QL5 technicians.

FROM THE CANADIAN FORCES TECHNICAL SCHOOL

ETFC — Deployment of Mechanical Company at Farnham

By Sgt JVAS Dulac and Mcpl JRD St-Jean.

Are our young qualified (QL3) branch technicians well prepared for their first posting with combat armed units?

We will not attempt to answer this question, however we have prepared a short expose of the common LEME training phase of the QL3's course as conducted by CFSEME and ETFC.

Gentlemen, orders . . .

Situation: Mechanical Company will deploy to Farnham for exercise "Initial Trust".

Mission: The Maintenance Platoon (Mechanical Company) will deploy into a tactical position and will assume the responsabilities of its own defence. No move before 1400 hrs.

Are there any questions?

Yes Mcpl, what is an exercise?

In reality the instructors/section commanders, have in front of them, groups of enthusiastic students all asking numerous questions.

All this is possible due to the common LEME training phase that is now an integral part of the vehicle technician's QL3 course.

The aim of the training is to prepare our trainees to execute various field tasks within combat armed units. In order to execute this training, approximately 200 instructor/mandays are required to prepare 48 anglophone/francophone students to participate in a 48 hour tactical field exercise. This exercise is the final confirmation of all subjects taught during the preceding weeks.

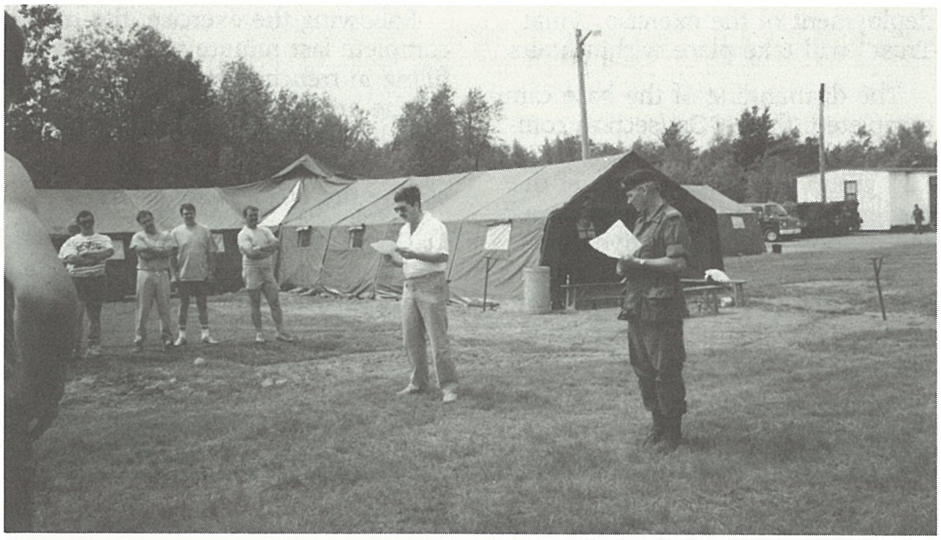
In this photograph, Mcpl J.G. Duchesne reviews a teaching point with his group of students. Take note that Mcpl J.D. Bibeau is ensuring that the tree remains upright.

Before this final exercise, the trainees have gone through two distinctive training phases.

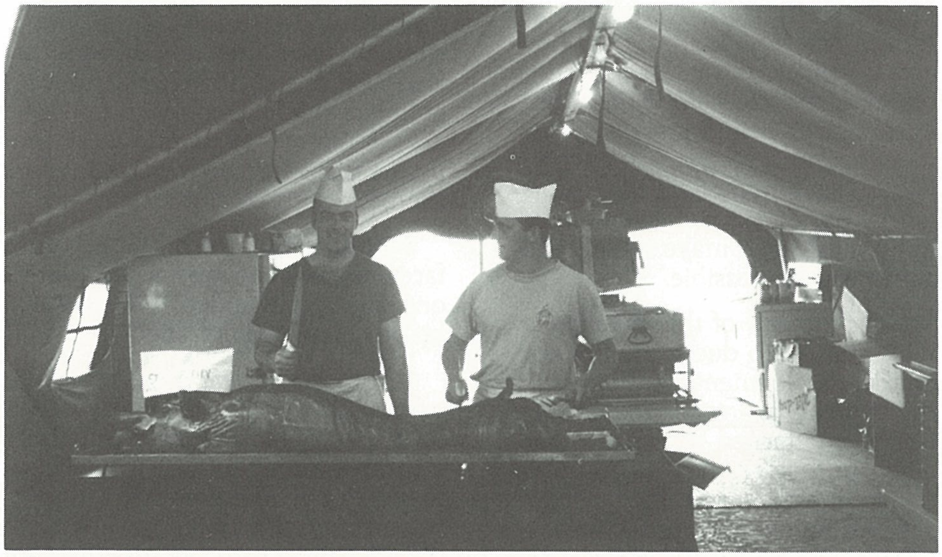
The first phase, given while still at the base, is a series of theoretical lectures taught over a five-day period. During the first two days the Captain and MWO cover the history of the branch and our maintenance organisation. These lessons are intended to familiarize the students with the scope and importance of tasks, attributed to the branch. It is also intended to give them a sense of belonging, in short, they become members of our large family. This is followed by lessons in administrative procedures and techniques pertaining to our trade. Finally lessons in combat clothing and equipment, field hygiene, radio voice procedures

Apon arriving into a new location, Pte R.S. Short (left) and Pte C.J. Johnston (right), execute the routine task of concealing their vehicule.

Sergeant coordinates the operations under the Captain's vigilant observation. The MWO is responsible for the welfare and discipline of the men and also acts as the I/C of the enemy force during the final exercise. In addition, the Standards WO, closely monitors training activities and advises us on a daily basis.



During R.C.E.M.E.'s 45th anniversary celebrations, Base Maintenance of B.F.C. St. Jean, joined E.T.F.C. in the fastivities held at the "Garnison de l'Estrie" Farnham. In the photo, Capt Pierre Plante (white shirt) and Capt Len Vachon (combat uniform) are explaining the rule to the sports competition.



Like every year, a succulent meal is part of the branch's anniversary celebrations. Here, Sgt J.A. Taillon (left) and Sgt J.V.A.S. Dulac (right) prepare to carve a braised pig.

This group of students, enjoying a rare rest period. In the foreground, and unaware of the photographer, is M.W.O. J.H. Richard, in a moment of meditation.

and map using are taught. These are intended as theoretical reviews of recruit training. This concludes the five day training in the classroom. By this time, the students are ready for the exciting part, "the practical phase". This signals the beginning of the second phase. First, a convoy of 26 of our vehicles is formed and then deployed to the Estrie Garnison (Farnham) which is some 30 KM from CFB Saint-Jean. Upon arrival, a camp of modular tents must be set up. All of this has to be executed in the shortest possible time so that it is fully operational by nightfall.

Due to past experiences and good planning, the camp is usually set up without major difficulties and we can all look forward to spending a comfortable first night under canvas.

Throughout this phase, the students are divided into three sections, under the direct supervision of 2 instructors. The platoon

On the administrative side, a Sergeant, subdivided into four subgroups provides all logistic support. The supply group, comprised of two Mcpls, are kept very busy meeting the different needs of both students and instructors. The kitchen staff, one Mcpl and two Soldiers from the PAT Platoon prepare and serve breakfast, serve lunch, and dinner, and provide a late meal. Their services are very much appreciated. The third group, maintenance employs two Mcpls. Their tasks are to install and maintain the electrical lighting and heating systems and the maintenance of all vehicles. With all the driving being done by the students, they are usually quite busy. Finally, one Mcpl provides the main link between CFB Saint-Jean and the stage camp. One of his tasks is to deliver hot meals and other goods promptly. All in all, these groups work well together and enjoy the change from classroom instruction.

Day two starts before daybreak, normally with one or two large "BANGS"! These are from the duty personnel lighting immersion heaters. This is the signal for everyone to wake up, wash and shave, eat breakfast and complete morning tasks before the daily morning parade. The parade commences at 0730 hrs with the hoisting of our LEME colors, during which time, our branch march past "Lillibulero and Auprès de ma blonde" are being played. This is followed by an inspection of the troops and camp facilities.

The phase two training schedule is a busy one where 16 hour working days are common and rest periods are few. This phase must be completed within seven days. Two days are dedicated to dry and live weapon training. The five remaining days are dedicated to field and trade related tasks.

Many of the lessons are devoted to local defence techniques and procedures. They include, trench digging, sentry duties, section defence, individual and vehicle camouflage and patrol and section movements. This part of the training is physically demanding due to the numerous practices. Still, the students look forward to putting their knowledge to good use during the coming exercise.

Other lessons deal more closely with the vehicle trade. In fact, they are the most exciting part of the training, for the students. As vehicle technicians, they are naturally interested in learning to drive vehicles during black-out conditions or backing up with a trailer. There is also the challenging, simulated mobile repair team fonctions. This training combines, driving, map using and radio voice procedures.

Each team, of two or three candidates, is given a mission which consists of locating a vehicle at a given grid reference and then, reporting, by radio, the vehicle's fault to the command post. Naturally, the members are rotated until all have experienced this training.

Phase two also continues with night foot patrols, this time, combining radio voice procedures, compass and map using, and section deployment practices. This phase will end with a short exercise, under the control of the Platoon Sergeant who ensures we are ready for the third and final phase, "the 48 hour exercise."

At daybreak of the eighth day, there is a hurried feeling in the air. This is the beginning of the final phase. The camp is dismantled and equipment not required is loaded onto vehicles and returned to CFB Saint-Jean, where the drying and cleaning process begins. During this time, the Captain is preparing his orders. The first tactical move and deployment of the exercise "Final Trust" will take place within hours.

The dismantling of the base camp completed, the NCOs (section commanders) emerge from the Captain's "O" group. They, in turn, brief the students. During the next 48 hours, the platoon will occupy five defensive positions with as many road moves. The first section must now be at the starting point within the hour.

During this exercise, the students are assigned different tasks which allow the staff to assess what was taught and practiced during the previous two phases.

This includes, that, the platoon establish and maintain its defence in all occupied positions, personnel in vehicules are camouflaged, perimeter trenches are dug, reconnaissance patrols, to confirm intelligence reports are properly carried out and for the first time this past fall, the actual vehicle repairs, at a given grid reference are tactically done. The exercise also includes some harassment and attacks from an enemy force. This group of six instructors led by the MWO is heavily armed in an attempt to make the exercise as realistic as possible.

Near the end of the 48 hours, with little sleep due to numerous attacks, deployments and patrols, the students are very tired. Having just been attacked in a road move ambush, they are now finally positioned in a hide with their defence systems properly set-up. A well-informed enemy is already in position and awaits the signal to begin the pre-dawn attack. Suddenly, para-flares light up the position. The enemy seems to be coming from all sides with all the ammunition they have. The well-trained troops remain under cover in their defensive trenches and return fire under the orders of their section commanders. In a last attempt, the enemy resorts to the use of tear gas. However, we are ready, our defence is strong and the enemy cannot penetrate. In the end, faced with well-organized and disciplined troops the enemy does not have any other choice but to retreat. The victory is ours and the signal that ends the exercise is at last given.

Following the exercise, the troops complete last minute tasks, such as, filling in trenches and area cleaning up the area before the lining up of vehicles for the return trip to CFB Saint-Jean. These duties are supervised by the Platoon Sergeant.

Upon arrival, vehicles are unloaded and weapons are cleaned, inspected and returned to the weapons vault. Only after all this is done are the students allowed to take a well deserved rest. The following day, always a Friday, the vehicles are washed and all extra equipment is cleaned and stored or returned to supply. This is completed before the week-end because come Monday morning, it is back to the old routine of classroom trade instruction.

Friday is also reserved for Captain Vachon's debriefing of the last three-week activities with all the staff. He is satisfied. The exercise has clearly demonstrated that the students have attained the performance objectives. However as he congratulates us for a job well done, he does not forget to remind us of the points that must be corrected before the next exercise.

Seated at the "round table", our faces express our satisfaction, but one can only wonder "When will he be completely satisfied?".

In conclusion, we hope that our young craftmen are adequately trained for their first posting as members of a combat armed unit. It would be unjust not to mention that if this training is today an integral part of the QL3 course, it is partly due to the initiative and tenacity of LCol Vlossak, whom in 1980, as CFSAOE LORE Company commander, was its pioneer.

FROM 202 WORKSHOP DEPOT

Implementation of Bar Code Readers Technology at 202 Workshop Depot

In the last years, 202 Workshop Depot has given itself as objective to implement up-to-date technology in its working process in order to approach a comparable performance vis a vis private industries. Lately, the use of computer science with the implementation of integrated control tools and instructions have increased 202's control over the status progress of each task. The implementation of a control and follow-up system for repaired equipment done at 202 WD with bar code readers terminal was the next logical step to take in its climb toward its goals.

Definition

A bar code readers terminal is a modular collection terminal that reads and collects bar code formatted data. A bar code is an alternative series of bar and space of different width. Each alpha-numerical character is represented by a bar and space serial and each code has a specific beginning and ending character.

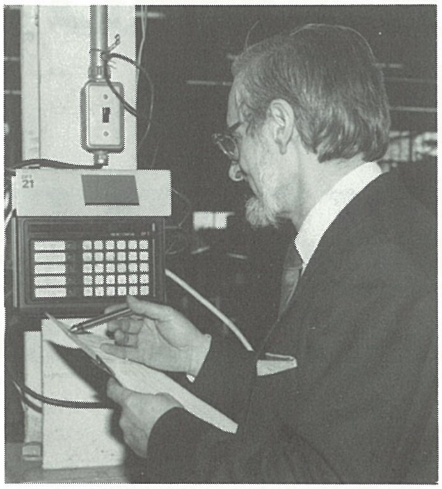
The system use at 202 Workshop Depot include:

a) a host programmable control unit that is responsible for collecting and processing the data from the bar code terminal, submitting different messages to the terminal and producing the transactions that are sent to 202's host computer;

b) 25 bar code readers terminal that receive and transmit data with an alphanumber display, a keyboard, a barcode wand, 5 LED's and an alarm; and

c) 4 coding and decoding unit (SALDE and RPA) that connect together all terminal of our three principal building (#3, #10 and #11) to the control unit through the telephone lines system.

Mr André Gosselin, Electrical Division Control Officer, and Mr Jean-Louis Cholette, Industrial Electrical foreman, are discussing the progress of the work and the upcoming tasks over a status report produced by the bar code terminal readers.



M. Jean-Louis Cholette, contremaître de la section électricité industrielle, effectue une transaction de réception, à l'aide d'un terminal-lecteur de codes numériques, après la réception d'un papier.

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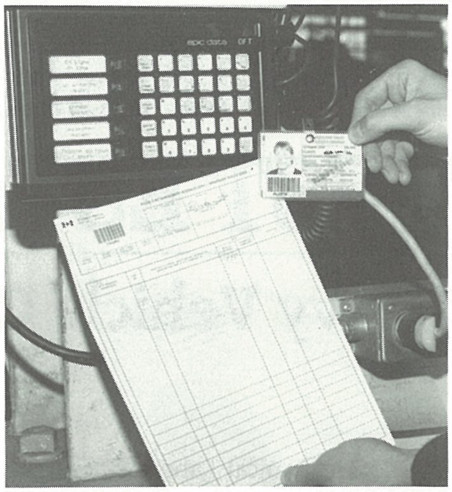
A bar code

The bar code readers system is utilized to follow the progress of pallets (group of specific equipment) throughout their repairs at the workshop. We are now collecting all



Three tools necessary for the use of bar codes:

- *a. the bar code reader,*
- *b. the inter-shop route card showing the sequence of operations, and*
- *c. the employee identification card bearing the employee's bar code.*

receiving (start of work) and shipping (end of work) operations concerning repaired equipment at each work center. In order to do just that, a bar code is printed on the employee's "ordinary pass" card, and on each inter-shop route card that represents the repair sequence of the equipment. The code printed on the route card identifies the equipment's pallet number.

In summary, when a work center's foreperson receive or ship some equipment in a pallet, he (she) must:

a) enter his (her) employee's number with the aid of his (her) card;

b) select the transaction that he (she) will execute (receiving or shipping);

c) enter the equipment pallet's number;

d) enter his associated operation number; and

e) verify if the displayed work center is accurate i.e. his work center for a receiving action and the next work center for a shipment.

This fast and simple process enters the requested data in the system, where the date and the time of the transaction is tagged on. It is then sent to a central file where all the informations concerning production task status is stored. This information give us the opportunity of producing immediately a more accurate report on task status in the workshop for all concerning parties (forepersons, supervisors, division officers, planners, project managers . . .).

The impact and the enthusiasm generated, up to now, by this new tool, implemented since october 89, leads the 202 WD managers toward several other interesting bar code applications such as material management including follow-up of spare parts and equipment and tools inventory.

The present and future utilization of the bar code technology at 202 Workshop Depot will permit the complete centralization of our basic data treatment and improve greatly the effectiveness and efficiency of our operations while simplifying the data collecting and reporting method. This centralisation of our data will give us a better evaluation of our capacity in order to serve more efficiently and professionally our clients.

Benoît Plante
Industrial Engineer
Project Manager

FROM THE LAND ENGINEERING TEST ESTABLISHMENT

Heavy Vehicle Chassis Dynamometer at LETE

The Mechanical Laboratory of the Land Engineering Test Establishment (LETE) has recently commissioned a Heavy Vehicle Chassis Dynamometer. This new piece of test equipment considerably enhances LETE'S capability to perform vehicle testing year round in a controlled environment. Specifications for the dynamometer were developed by LETE and included the capability to test all wheeled vehicles currently in service with the Canadian Armed Forces from the Iltis to the HLVW. The end result was the acquisition of one of the largest, most powerful, dynamometers of its kind in North America and one of the first to be 100 per cent digitally controlled.

Technical Description

The design and construction of the dynamometer was contracted to the Burke E. Porter Machinery Company, who are specialists in the field of dynamometers and heavy test equipment. The basic layout consists of three rolls, with each roll powered by a 300 kilowatt direct current motor with a regenerative power capability that feeds AC power back into the building when the dynamometer is run in absorption mode. Digital control of the DC motors is accomplished through a sophisticated system of ten microprocessors running concurrently on a priority interrupt system. Various vehicle wheelbases are accommodated by adjusting the location of the front roll which is on a powered sliding base. Different drivetrain configurations are possible and include two, four and six wheel drives. Primary specifications are as follows;

Vehicle Weights:	1,100 Kgs to 22,700 Kgs
Vehicle Wheelbases:	1.020 M to 5.420 M
Tandem Wheelbases:	1.020 M to 1.520 M
Maximum Tractive Effort:	120 KN
Maximum Power Absorption:	820 KW
Speed Range:	1 to 120 KM/H
Maximum Acceleration Rate:	11.5 KM/H/S

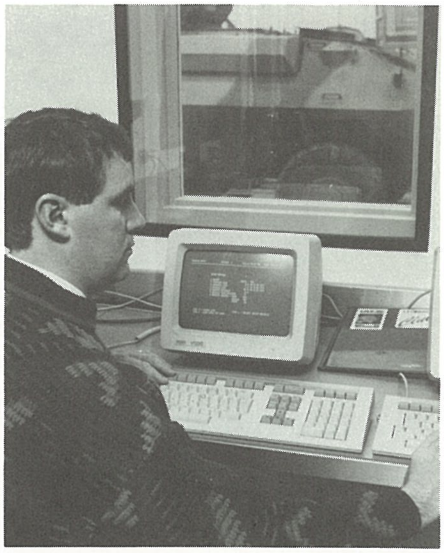
Test vehicles are located and secured by chains attached to adjustable cross members at either end of the dynamometer. This system allows test vehicles to be quickly attached and centred without the need to modify their structure. A fully enclosed, climate controlled test cell houses the dynamometer. To ensure driver safety, sensors monitor the test cell for high levels of carbon monoxide and propane. If hazardous levels are sensed, the driver is warned and the dynamometer is automatically shut down at a controlled rate.

Since the dynamometer is one of the first of its kind a great deal of effort was involved in commissioning and calibrating the system. The majority of commissioning problems centred around getting all three rolls to run together to prevent possible damage to the vehicle drivetrain. Other systems have been developed for single roll dynamometers but this was the first application of multiple independently driven rolls by Burke Porter. Calibration took approximately one year to complete and involved building a data base of military vehicle performance specifications and then matching measured road performance of each vehicle to the dynamometer simulation.

Dynamometer Testing Capabilities

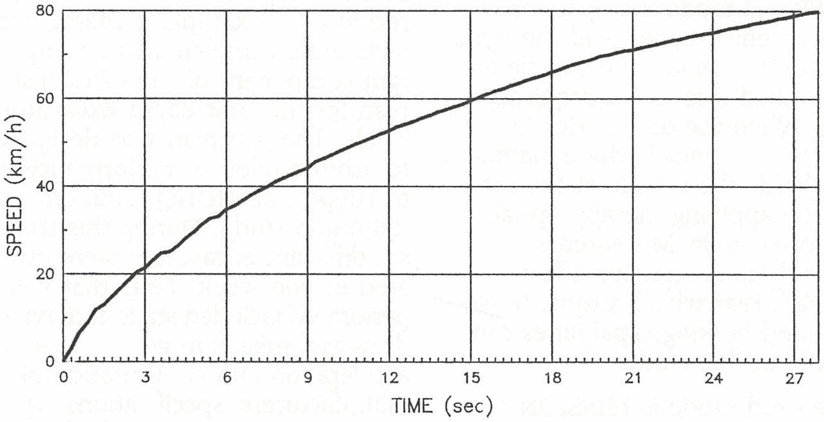
A wide variety of vehicle tests can be performed in any one of three computer controlled test modes selected by the operator. These test modes are Road, Speed and Mission Profile.

ROAD mode simulates actual driving characteristics of the vehicle. The operator enters vehicle attributes such as weight, aerodynamic drag, drivetrain configuration and axle torque splits. Additionally, special situations such as towing a trailer, can be simulated by entering the trailer attributes at the same time. When the driver accelerates, the dynamometer calculates constant loads along with vehicle aerodynamic and inertia forces and applies the appropriate force to the rolls throug a second degree Road Load Equation. In this mode vehicle performance tests such as accelera-

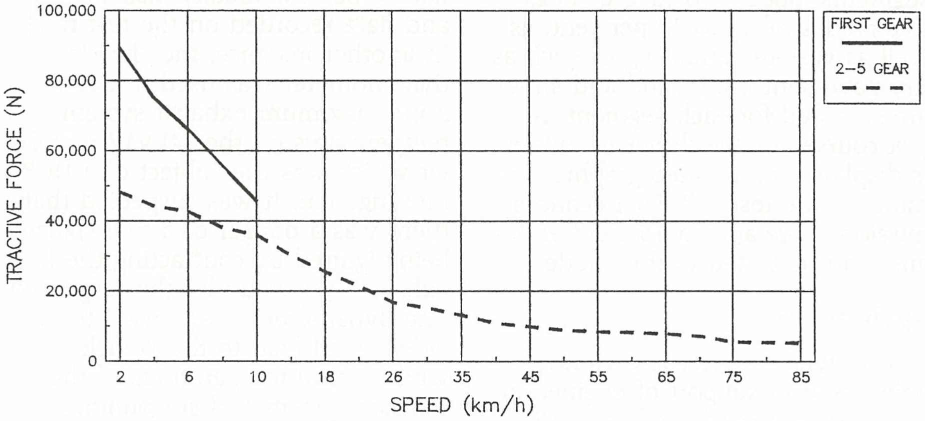


AVGP Performance tests being conducted

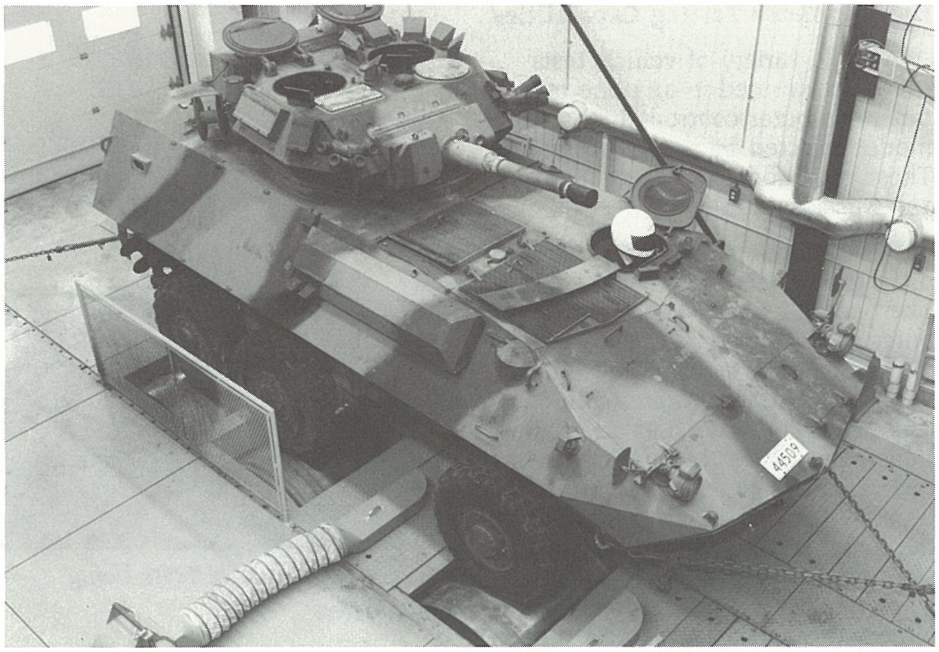
AVGP COUGAR ACCELERATION TEST
6X4 DRIVE CONFIGURATION



AVGP COUGAR TRACTIVE EFFORT TEST
6X4 DRIVE CONFIGURATION



(AVGP Acceleration and Tractive Effort Graphs (Fig 3)



Performance Testing of the AVGP on the Dynamometer (Fig 1)

tion, braking, coastdown, speeds in gear and maximum speed can be performed.

In SPEED mode the operator enters a vehicle speed and the dynamometer accelerates the vehicle at the specified rate to the required speed. When the driver tries to accelerate the vehicle the dynamometer holds the vehicle at the set speed by applying the appropriate force to the rolls. Measurements such as dynamic tractive effort (drawbar), rear wheel torque, horsepower and braking capabilities can be made in this mode.

The third mode is MISSION PROFILE, where the dynamometer simulates a test course of up to 100 kilometres composed of multiple segments. Speed, positive or negative grades of up to 30 per cent, as well as various terrain types such as dry pavement mud, sand and snow are specified for each segment. A test course, for the driver to follow, is displayed on a video graphics terminal in the test cell. Fuel economy, mission range and component endurance can be tested in this mode.

Applications

The dynamometer is currently being used in support of engineering test programs conducted at LETE. The ability to quickly and accurately perform a broad range of vehicle tests has proven to be a great asset by greatly reducing test times for evaluations that previously had to be performed on the test track. Just recently for example, dynamometer tests were completed as an important component of the LETE test plan for the Unit Rapid Excavator Trials. The test plan was designed to acquire relevant performance data to support an NDHQ requirements definition study. During this trial, six different excavators were evaluated in one week. Tests that were performed included static and dynamic drawbar, speeds in gears, rates of acceleration and confirmation of the manufacturers' specifications. By conventional test methods this evaluation would have taken over a month as each vehicle would have had to be individually instrumented and data recorded on the test track. In another instance, the chassis dynamometer was used to determine maximum exhaust system temperatures on the MLVW refueller which was the subject of a UCR investigation. It was suspected that there was a danger of a fuel spillage being ignited by contracting the hot exhaust system under the cargo bed. The dynamometer was used to provide a road load to the vehicle while critical temperatures of the exhaust system and surrounding area were scanned with an infrared thermography system located beside the vehicle in the test cell. By being able run the MLVW under load in a stationary position, more detailed and accurate measurements were obtained than would have been possible through field instrumentation alone.

Overall, significant benefits to the Army's engineering test and evaluation capabilities have been realised with the addition of the chassis dynamometer. Certain tests such as axle torque and horsepower splits were simply not possible to perform at LETE previously and other tests such as dynamic drawbar were very time consuming to instrument and perform. Even relatively simple tests such as fuel consumption are rendered more accurate and repeatable as test conditions can be controlled and held constant. Component testing on a vehicle under load and in motion is now possible resulting in a greatly enhanced engineering test capability.

Due to the unique nature and size of the chassis dynamometer, future applications promise to be both interesting and challenging. As well as expanding testing services within the Canadian Armed Forces, other agencies can be accommodated as scheduling of available time and manpower permits. The Department of Transport have expressed an interest in using the dynamometer to perform heavy vehicle emissions testing. Additionally, agencies such as the United States Army (TECOM), the National Research Council and private companies have also expressed considerable interest in using the dynamometer for development projects.

The chassis dynamometer has resulted in a substantial step forward in the measurement of vehicle performance at LETE and new applications for the dynamometer are being constantly developed. By continuing to expand its engineering capabilities, LETE hopes to continue to improve its ability to perform a thorough and professional job for its clients.

G. Baker *Mechanical Laboratory Engineer*

B. Lavigne *Mechanical Engineering Technologist*